



*ultra***D** Water Meter Manual



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1. Overview and Warnings

The measurement method of ultraD water meter is based on dual path, transit-time, ultrasonic technology. The ultraD water meters combine measurement, calculation and display, and can be widely used for regional water supply systems and cooling water systems, etc. Read these instructions carefully before beginning installation and save them for future reference.

- This product is a precise measuring instrument and has been thoroughly inspected and tested before shipment. So the calibration, maintenance and replacement should be operated by professionals. For more technical support, please contact us.
- The lead seal of the meter should not be destroyed. Otherwise, we are not responsible for warranty.
- This product is suitable for measuring clean water or homogeneous liquid in full filled pipes, not suitable for measuring underground muddy water.
- To select the installation location, please pay attention to the following points:
 1. Do not install the meter near the variable frequency pump, electric machinery or other electromagnetic interference environment.
 2. If the installing pipe is connected by contracted pipe, expanded pipe, bends or other flow disturbers, please select other installation location or rectify the pipeline (If you need the meter without installation requirement of straight pipe, please contact the factory).
 3. The preferred installation location is horizontal pipe, followed by the vertical pipe with upward (or obliquely upward) flow, avoiding the downward (or obliquely downward) flow to prevent the partially filled pipe.
 4. Since air collects at the highest point of the pipe, installation of the water meter should be at the lowest point to avoid measuring errors.
- Before installing the meter, ensure that the circulation line has been cleaned to prevent any stones, sand or other debris.
- It is recommended to install valve in the pipeline before and after the meter for easy maintenance. After the meter is installed and before opening the pipeline valves, be careful not to form a negative pressure in the pipe of the meter installation location, in order to avoid damage to the meter.
- After installation is complete, it is recommended to keep the lid closed to avoid direct sunlight exposure.
- If you do not use cable communications, please keep the cable for later use.
- When communicating, do not make any cables of this product near heat sources to avoid damage to the cable insulation layer caused by the deformation of the cable, so as not to cause fire or electrical accident.

2. Technical Specifications

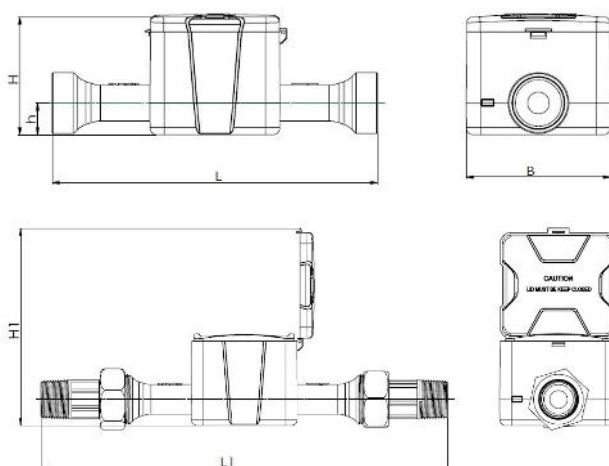
Maximum Working Pressure	1.6MPa
Temperature Class	T30, T50 (Higher temperature customizable)
Accuracy Class	Class 2 (ISO4064:2005)
Battery Life	10 years, 20 years
Ingress Protection	IP68
Environment Temperature	-20~70°C, ≤100%RH
Pressure Loss	Δp_{10}
Climatic and Mechanical Environment	Class C
Electromagnetic Environment Class	E2
Flow Profile Sensitivity	U3/D0
Display	9 digit LCD Display + prompts Cumulative flow (m ³), Instantaneous flow (m ³ /h), Flow direction, Alarm, Battery level, Output mode, etc.
Connections	Threads (DN15-40), Flanges (DN50-300) according to DIN (EN1092-1) (Other standards customizable)
Date Storage	Store the data in last 7×24h, 365 days and 72 months
Output (optional)	RS485 (ModBus), M-Bus, OCT pulse, two wire 4-20mA
Accessories	Wireless GPRS/GSM, Wireless handheld operator
Power Consumption	<0.5mW
Cable Length	Standard 1m (Other requirements customizable)

3. Installation

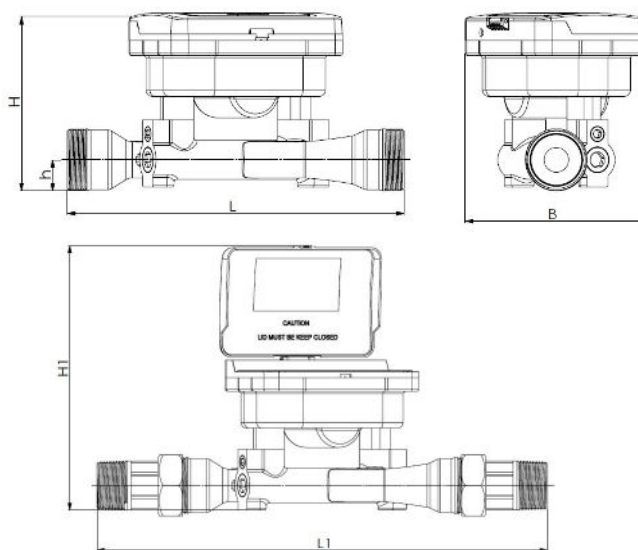
3.1 Dimensions and Installation

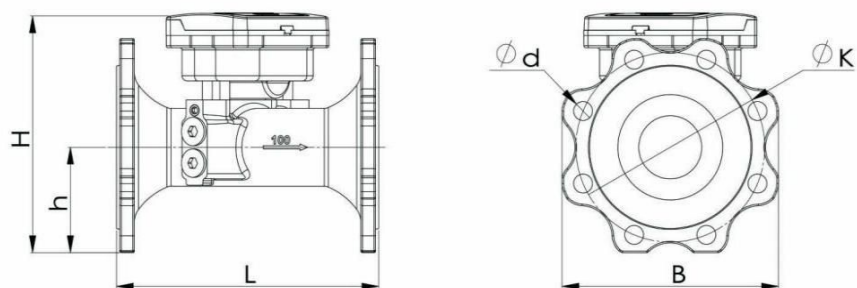
Meter Size	(mm)	15	20	25	32	40
	(inch)	1/2	3/4	1	1 1/4	1 1/2
L - Length (mm)		165	195	225	260	300
B - Width (mm)		100	100	100	90	130
H - Height (mm)		83	83	83	130	132
H1 - Height (mm)		166	166	166	226	225
h - Height (mm)		22	22	22	19	20
L1-Length (mm)		260	290	345	385	430
Weight (kg)	SS	1.0	1.2	1.4	4.8	6.5
	Brass	0.14	0.52	0.81	1.57	3.39

DN15-DN25



DN32-DN40



DN50-DN300


Meter Size	(mm)	50	65	80	100	125	150	200	250	300
	(inch)	2	2 1/2	3	4	5	6	8	10	12
L- Length (mm)		200	200	225	250	250	300	350	450	500
B - Width (mm)		125	142	186	204	240	285	340	395	445
H - Height (mm)		180	185	213	226	231	280	327	374.5	414.5
h - Height (mm)		65	68	93	102	112	142.5	170	197.5	222.5
d x n		18x4	18x4	18x4	18x4	18x4	22x8	22x8	22x12	22x12
K (mm)		125	145	160	180	210	240	295	355	410
Pressure (MPa)		1.6	1.6	1.6	1.6	1.6	1.6	1	1	1
Weight (kg)	SS	9	11	13	16	21	29	46	60	74
	Cast Iron	6	6.5	13	16	21	30	45	55	68

Remarks

d: diameter of bolt holes, n: numbers of bolt holes, K: central circle diameter of bolt holes

* Other requirements customizable

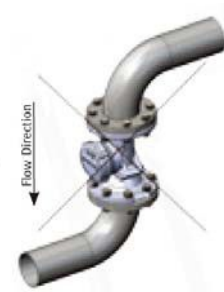
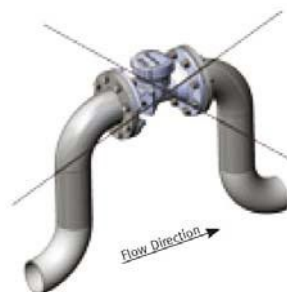
3.2 Location and Position

Only suitable for bulk water meters from DN50 to DN300

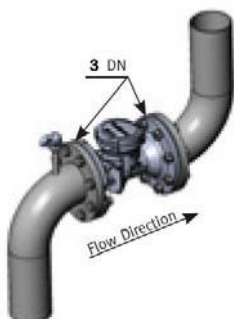
A) Proper Installation



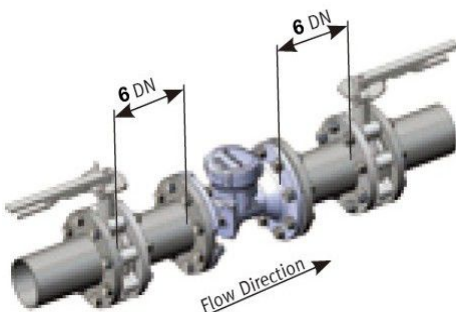
B) Wrong Installation



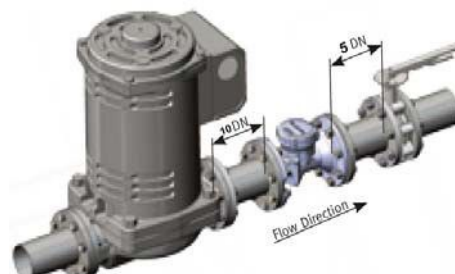
C) Recommendations for achieving top performance



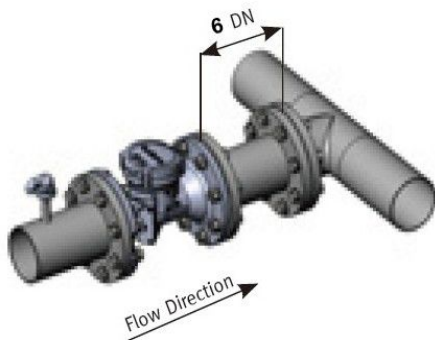
3 pipe diameters before and after elbows (90°)



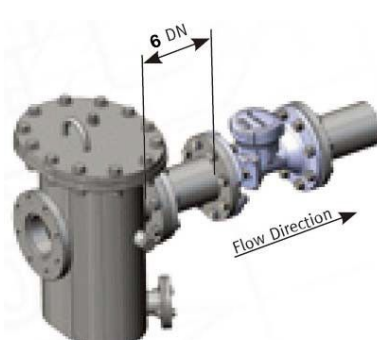
Minimum of 6 pipe diameters before and after



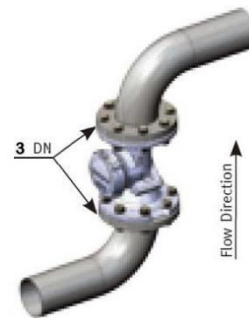
Minimum of 10 pipe diameters after pumps



Minimum of 6 pipe diameters before T connections



Minimum of 6 pipe diameters after strainers



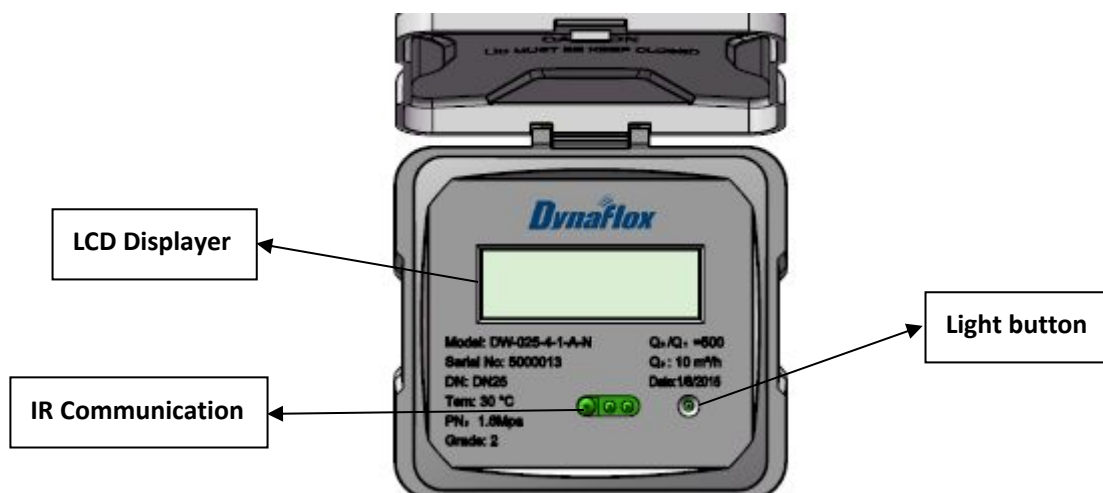
3 pipe diameters before and after elbows (90°) in vertical installations

4. Display Description

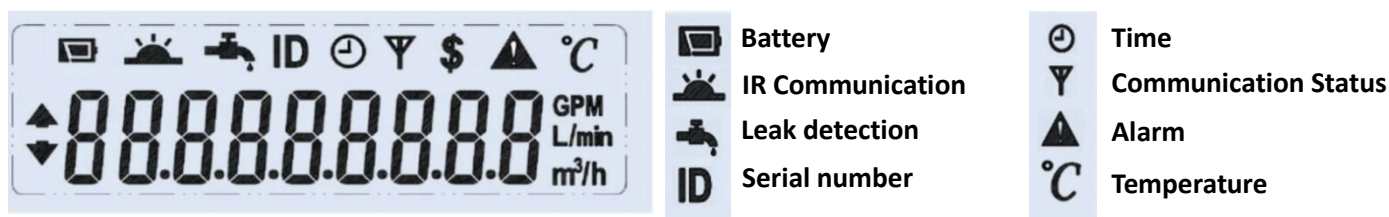
The cumulative flow, instantaneous flow and the status flag are displayed on the LCD screen. It can offset the drawbacks of the past magnet rod operation which requires to switch the display screen to see all parameters of the meter. Operators can check the meter status at any time without a magnet rod.

Digital display contents are as follows:

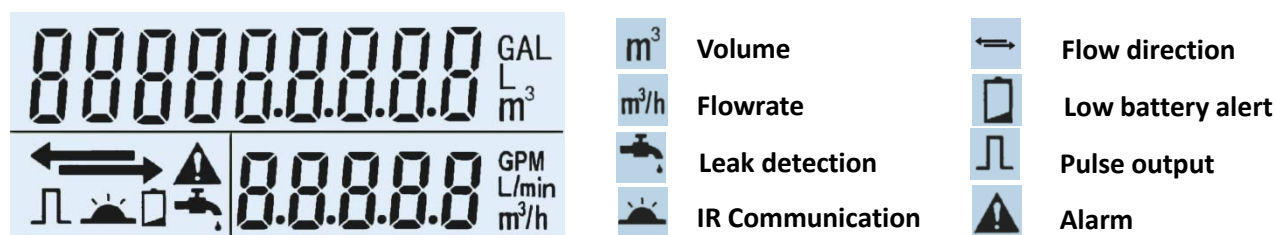
4.1 Digital Display (DN15-25)



LCD display: The switch between different screens is achieved by the light button. The light button can work normally when the light intensity meet the requirement. When it's dark, a lamp can be used to illuminate the light button.



4.2 Digital Display (DN32-300)



-  Flow direction
-  Alarm, means empty pipe or error
-  The pulse output function has been open
-  Infrared communication
-  The battery power is low, please replace the battery as soon as possible
-  Leakage occurred in the pipe
- m^3 Volume units (can be set GAL (US gallons) and L units according to customer requirements)
- m^3/h Flowrate units (can be set GPM (US gallons) and L/min units according to customer requirements)

5. Modbus Communication Protocol

5.1 Modbus-RTU Protocol Introduction

Ultrasonic water meter supports Modbus-RTU protocol. Baud rate: 1200, 2400, 4800, 9600 optional.

Character type 8 data bits, no parity bit, 1 stop bit

5.2 Modbus-RTU Protocol Message Frame

Start Bit	Address Code	Function Code	Data Area		CRC Code	Terminator
4 characters' time	1 byte	1 byte	2 bytes (register address)	2 bytes (number of register)	16 digital	4 characters' time

- ◆ Start Bit: under RTU mode, messages start to send by interval time of 4 characters.
- ◆ Address Code: Within a network, the address code is unique, range: 1--247. Address 0 is used as a broadcast address, not for stand-alone communications.
- ◆ Function Code: the water meter only uses function code 03, namely: read register data.
- ◆ Data Area: corresponds to the function code 03, there are a total of four bytes when the mainframe sends commands:

2 bytes (register address)	2 bytes (number of register)
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The first two bytes are the first address of the register to be read;

The last two bytes are the number of register to be read (up to 22).

1 byte the number of bytes in data area	N bytes specific register data
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When the machine responds, the first byte is the number of bytes in data area (not including itself);

The following bytes in data area are the value of the register to be read; the length is determined by the first byte.

- ◆ CRC Code: two-byte error detection code. Low byte is in front of high byte.
- ◆ Terminator: after the transfer of the last character, the pause time of 4 character marks the end of the message.

5.3 Register List

Baud rate	1200	2400	4800	9600	
Parity bit	None				
Stop bit	1				
Data bit	8				
Address	Length	Data Type	Data Content	Unit	Remark
0	2	long	Instantaneous flowrate	L/h	
2	2	long	Positive cumulative flow (integer part)	m3	
4	2	long	Positive cumulative flow (decimal part)	mL	
6	2	long	Negative cumulative flow (integer part)	m3	
8	2	long	Negative cumulative flow (decimal part)	mL	
10	2	long	Run time	s	
12	2	long	Fault time	s	
14	2	long	Battery voltage	mV	
16	1	int	Error code		
Historical data					
0x9000	1	int	Number of historical data per hour		
0x9001	1	int	Number of historical data per day		

0x9002	1	int	Number of historical data per month		
Historical data per hour					
0xA000	2	long	Time		
0xA002	2	long	Positive cumulative flow (integer part)	m3	
0xA004	2	long	Positive cumulative flow (decimal part)	mL	
0xA006	2	long	Negative cumulative flow (integer part)	m3	
0xA008	2	long	Negative cumulative flow (decimal part)	mL	
0xA00A	2	long	Time		
0xA00C	2	long	Positive cumulative flow (integer part)	m3	
0xA00E	2	long	Positive cumulative flow (decimal part)	mL	
0xA010	2	long	Negative cumulative flow (integer part)	m3	
0xA012	2	long	Negative cumulative flow (decimal part)	mL	
.....					
Historical data per day					
0xB000	2	long	Time		
0xB002	2	long	Positive cumulative flow (integer part)	m3	
0xB004	2	long	Positive cumulative flow (decimal part)	mL	
0xB006	2	long	Negative cumulative flow (integer part)	m3	
0xB008	2	long	Negative cumulative flow (decimal part)	mL	
0xB00A	2	long	Time		
0xB00C	2	long	Positive cumulative flow (integer part)	m3	
0xB00E	2	long	Positive cumulative flow (decimal part)	mL	
0xB010	2	long	Negative cumulative flow (integer part)	m3	
0xB012	2	long	Negative cumulative flow (decimal part)	mL	
.....					
Historical data per month					
0xC000	2	long	Time		

0xC002	2	long	Positive cumulative flow (integer part)	m3	
0xC004	2	long	Positive cumulative flow (decimal part)	mL	
0xC006	2	long	Negative cumulative flow (integer part)	m3	
0xC008	2	long	Negative cumulative flow (decimal part)	mL	
0xC00A	2	long	Time		
0xC00C	2	long	Positive cumulative flow (integer part)	m3	
0xC00E	2	long	Positive cumulative flow (decimal part)	mL	
0xC010	2	long	Negative cumulative flow (integer part)	m3	
0xC012	2	long	Negative cumulative flow (decimal part)	mL	
.....					
Definition of error code					
	10	Sound wave receiving timeout	Check whether blank pipe or bubbles in water		
	01	Velocity out of range			
	02	Water temperature out of range			

6. Handheld Operator Description

The accumulative flow, instantaneous flow and the status flag of the meter are displayed on the LCD screen without additional operations, but in order to meet some users' special requirements, the company has developed a special tool to configure the meter - wireless handheld operator. It has the following functions:

1. Read the current data, including accumulative flow, instantaneous flow, battery level, time and host number.
2. Query the historical data: the number of records, historical accumulative flow, etc. The data is saved in the handheld operator as .CSV format, and can be open by excel when exported to a computer.
3. Parameter settings: including user setting, factory setting, pulse setting and the current setting. The factory setting can be statically set to zero, cut the zero point, set the time and change the password, meter factors and accumulative flow, etc.
4. Parameter query: including software version, MBUS, pulse, display units and current, etc. The relevant operating instructions of infrared handheld operator refer to "infrared handheld operator manual." For customers who need to order infrared handheld operator, please specially note when ordering the meters.

Note the following information when using infrared handheld operator:

1. The infrared handheld operator must be used within 0.5m from the infrared probe, beyond the scope will lead to failure reading.
2. Please align the infrared probe at the infrared interface of the meter. Failure reading indicates that the infrared probes are not aligned, please re-align.
3. The infrared handheld operator is powered by three 5-size rechargeable battery. When the battery is fully charged, the voltage is usually 4.2V-5.3V. When the battery voltage is lower than 3.3V, it indicates that the voltage is too low, please recharge the battery timely, otherwise it will shut down automatically or fail to boot.
4. The factory setting can be only set by the factory in principle, and has been password protected. In some special circumstances, if customers need to use the factory settings, please contact the factory to get a password.

About the detail operation, please see our handheld operator manual.

7. Replace Battery

This product uses 3.6V lithium battery and the battery can be used for more than 10 years.

When battery voltage is low, the screen will display the symbol,  indicating that the user needs to replace the battery.

8. Troubleshooting and sales commitments

8.1 Common Troubleshooting

If the product has the following problems, please refer to the solution. If other faults, please contact the factory for repair.

Fault code		Fault Detail	Solutions
Err 01		Operation error	Contact factory
Err 10	Long-term display 	1. Empty pipe 2. Meter failure	1.Make the pipe be filled with water 2.Contact factory
	Frequently display 	The liquid has excessive bubbles or impurities	Release the air or remove the impurities.
Display“  ”		Battery voltage is low.	Replace the battery.

8.2 Warranty

Dynaflow follows the enterprise culture of "Respect, Harmony, Innovation and Integrity", respect the interests of our customers, we solemnly promise to you:

1. From the date of delivery, meters enjoy one year free warranty.
2. If user demands, the company will appoint professional technician to help users solve the problem at the first time.
3. Dynaflow will not be responsible for and will have no obligation under the Warranty to the following situations:
 - 1) Damage caused by human factors, such as smashing, wrestling, etc.
 - 2) Damage caused by irresistible factors, such as lightning, etc;
 - 3) The product is opened, modified or repaired by any person other than a technician from Dynaflow or if it is repaired using unauthorized parts.
 - 4) Damages caused by failing to follow the instructions of the manual to install, use or maintain the meter.
 - 5) For the above reasons the maintenance expenses should be beared by users.

NivoTech
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*The Company reserves the right to modify the information of the products. It is subject to change without notice

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