

BTU Meter Ultrasonic Heat Meter

Model: ULTA-50-500



User manual

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1. Heat Meter Work Principle and Structure

◆ Heat meter definition

Heat meter is one kind of meter which measure and display heat energy when water through the heat exchange system .

◆ Working principle

When the water through the heat meter which installed in the heat exchange system, then meter's calculator calculates and display the release or absorption of heat energy according to flow quantity from the flow sensor and the temp. signal of Inlet and Return flow from matching temp. sensors, and the water flow through time.

◆ The advantages of ultrasonic heat meter

- ◇ Adopt imported precision electronics components, high measurement accuracy, low power consumption, good stability;
- ◇ No dirt deposited dead angle, no impurities by the medium, chemical material and the interference of magnetic materials, suitable for our country water quality;
- ◇ Measurement mechanism has no moving parts, then never wear, long service life;
- ◇ Minimal loss of pressure, to improve heating quality;
- ◇ M-bus, RS-485, LoRaWAN, LoRa RF, Pulse output and NB-IoT remote transmission modes for option;
- ◇ Using in wide range, both for cold and hot water;

◆ The key components of ultrasonic heat meter

- ◇ ultrasonic Flow sensor:
Installed in the heat exchange system, this part collect water flow quantity and send the signal.
- ◇ Temperature sensor(PT1000):
One pair of metrological characteristics consistent or similar temperature sensor respectively measure the inflow and outflow temperature in the heat exchanging system on the same heat meter.
- ◇ Calculator:
Receiving the signals from the flow sensor and matching temperature sensors, then calculating, storage and display the heat (cold) value in the heat exchanging system.
- ◇ LCD display:
Mainly display the heat, flow rate, temperature, time and other information.
- ◇ Battery:
Power supply for the calculator.

2. Implementation Standards

Our heat meters are designed and manufactured in compliance with the following international standards and certifications:

MID (2014/32/EU): Certified for use in custody transfer and billing applications within the European Union, ensuring measurement accuracy and legal compliance.

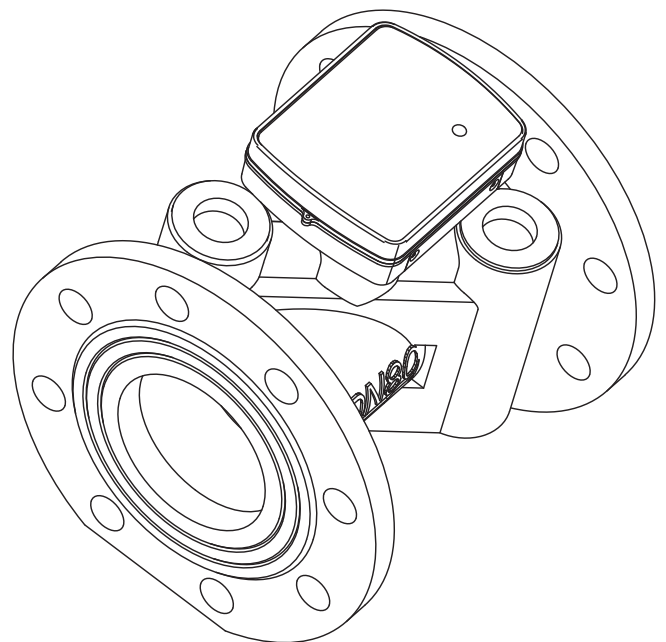
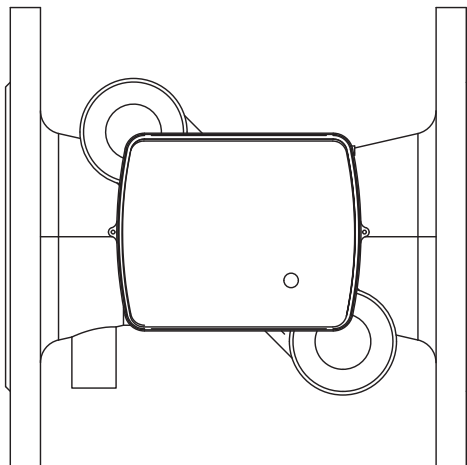
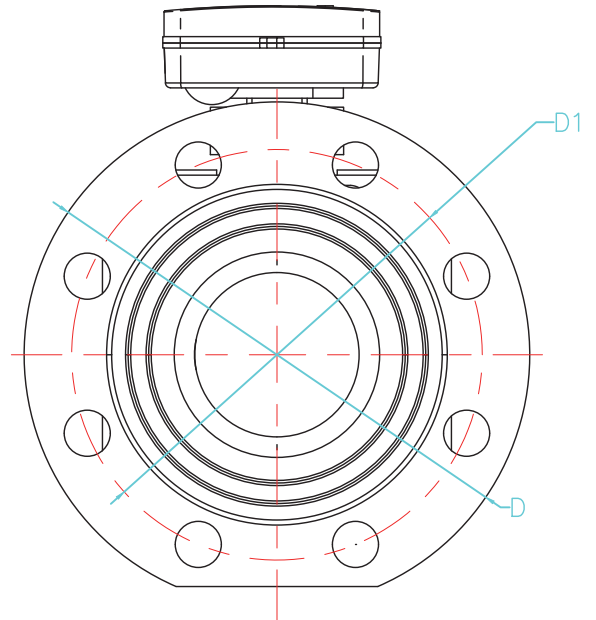
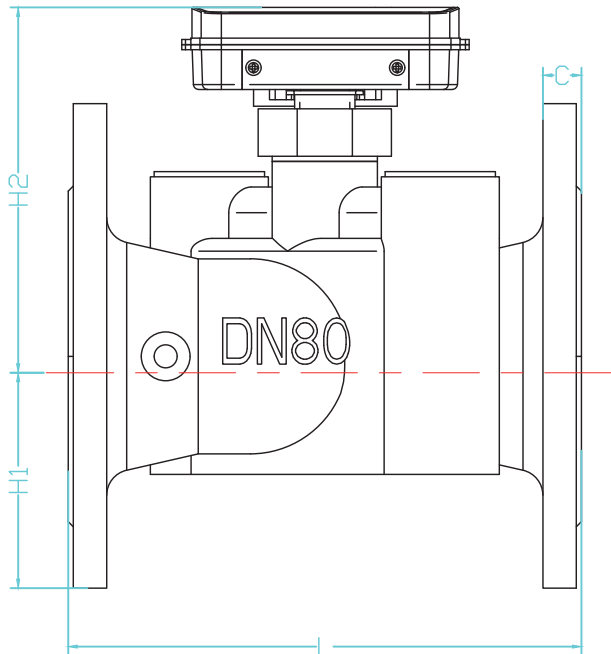
EN 1434: The metering performance and remote communication of this heat meter series comply with European Standard EN1434.

CE Marking: Declares conformity with EU directives on safety, electromagnetic compatibility (EMC), and environmental protection.

3. Technology specification

Diameter(mm)	Q _n (m ³ /h)	Q _{min} (m ³ /h)	Q _{max} (m ³ /h)	Length (mm)
DN50	15	0.6	30	200
DN65	25	1.0	50	200
DN80	40	1.6	80	225
DN100	60	2.4	120	250
DN125	100	4.0	200	250
DN150	150	6.0	300	300
DN200	250	10.0	500	350
DN250	400	16.0	800	450
DN300	600	24.0	1200	500
DN350	750	30.0	1500	500
DN400	1000	40.0	2000	500
DN450	1200	48.0	2400	500
DN500	1500	60.0	3000	500
Range ratio	R25			
Measurement Accuracy	EN1434 Class2			
Connection	Flange			
Pressure Loss	≤ 20KPa			
Pressure Level	≤ 1.6MPa			
Temperature sensor	3m standard two lines PT1000 Temperature Sensor (cable length could be changed)			
Data Storage	Continuous store of 38 months record			
Power-off Protection	After power-off, meter could save all the record of before flow rate and the corresponding time, after power back, it recovery measure function automatically, and ensure the time continuation			
Communication mode	Mbus, RS485, LoRaWAN, LoRa RF, Pulse output and NB-IoT			
Power Supply	ER18505 Lithium battery			
Protection Class	IP67			
Environmental Class	Class B			
Temperature Range	(4~95) °C			
Temperature Difference	(3~90)K			
Installation Way	Inflow or Return flow installation (Default is Inflow installation, for return flow need to indicate when ordering)			
Battery life	Service cycle≥10 years			
Display	LCD display			
Anti-magnetic Disturbance	When the intensity of magnetic field interference is not more than 100 ka/m, should not affect water meter measurement and remote transmission characteristics.			

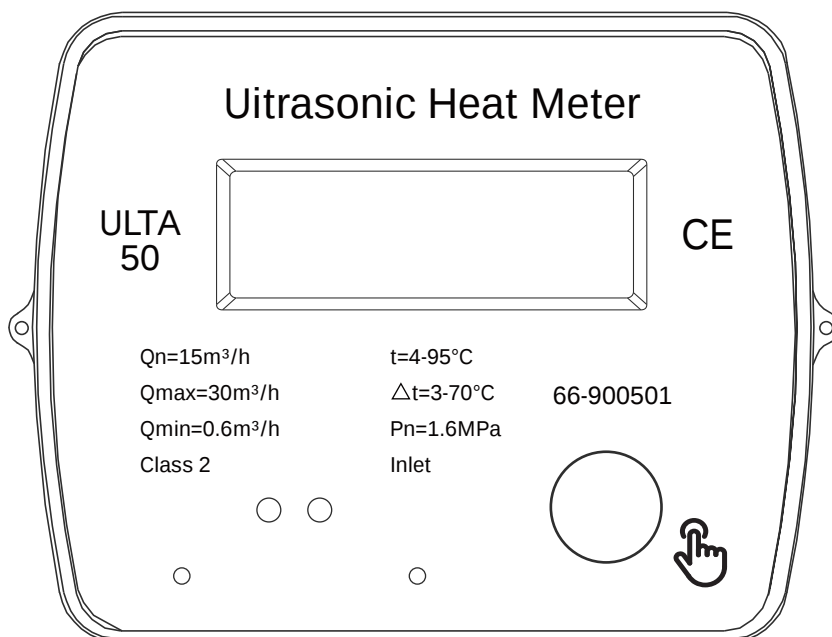
4. Outline dimension



	L(mm)	H1(mm)	H2(mm)	C(mm)	D(mm)	D1(mm)	Bolt Hole	Weight(Kg)	Pressure(Mpa)
DN50	200	72	115	18	165	125	4-ø18	7.2	1.6
DN65	200	78	125	18	182	145	4-ø18	7.8	1.6
DN80	225	88	132	20	197	160	8-ø18	9.2	1.6
DN100	250	98	142	22	218	180	8-ø18	12.2	1.6
DN125	250	116	155	22	245	210	8-ø18	16.5	1.6
DN150	300	135	165	24	283	240	8-ø22	22.5	1.6
DN200	350	162	193	24	335	295	12-ø22	30.0	1.6
DN250	450	195	225	26	405	355	12-ø26	56.0	1.6
DN300	500	223	250	28	460	410	12-ø26	85.0	1.6
DN350	500	250	280	30	520	470	16-ø26	110.0	1.6
DN400	500	280	310	32	580	525	16-ø30	145.0	1.6
DN450	500	310	340	40	640	585	20-ø30	178.0	1.6
DN500	500	348	378	44	715	650	20-ø33	202.0	1.6

5. Panel Design

Example:



ULTA-50-500

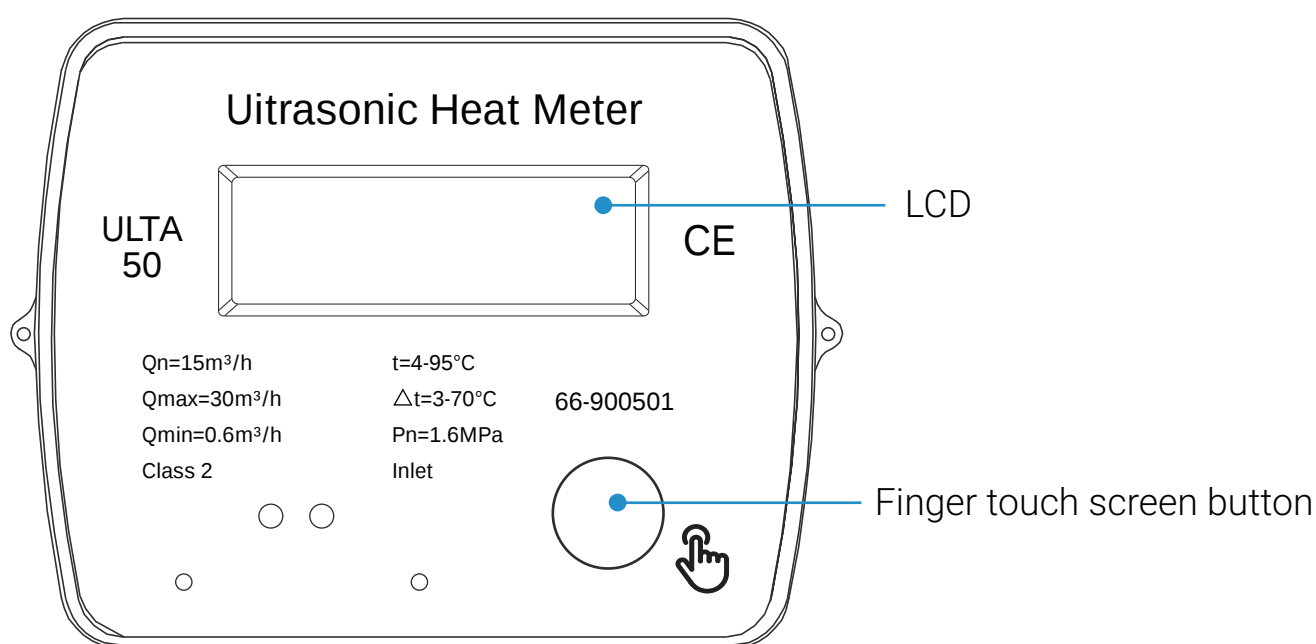
6. Operation and display

6.1 Operation

6.1.1 Users can use their fingers to touch buttons to switch the display content and view relevant data measured by the instrument. The instrument displays data in a cyclic menu structure.

6.1.2 The LCD main menu consists of 4 modes: User Menu, Test Menu, Information Menu, and Error Message Menu. The conversion between 4 modes, with a key press time > 3s; Switching of menu display in the same mode, key press time < 1s.

6.1.3 User mode allows viewing of the following parameters: accumulated heat, accumulated cooling capacity, power, accumulated volume, flow rate, inlet temperature, return temperature, temperature difference, accumulated working time, meter number, nominal diameter, and full-screen display.



6.2 Display

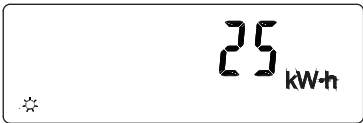
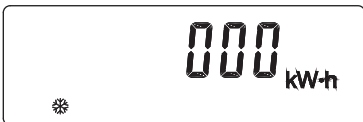
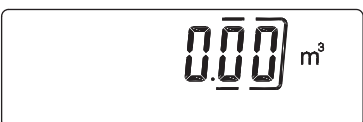
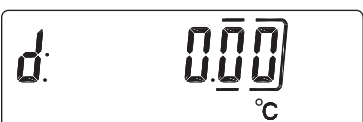
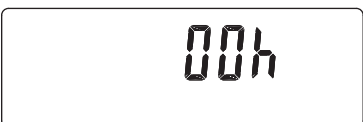
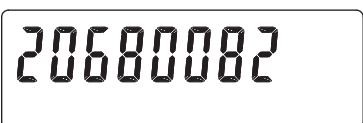
6.2.1 Full screen display

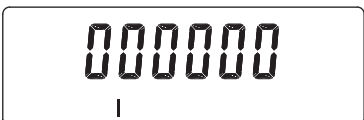


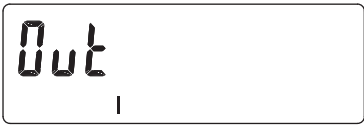
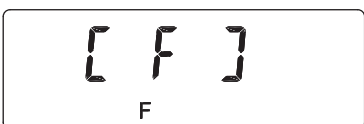
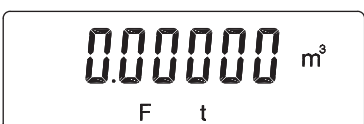
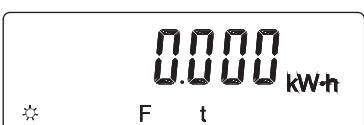
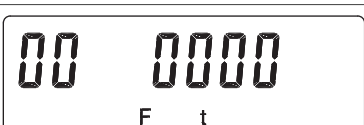
6.2.2 Display Icons definition

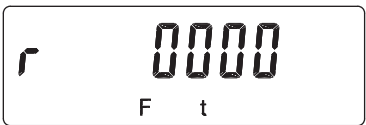
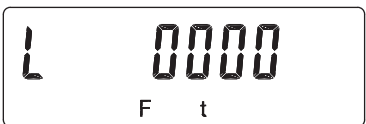
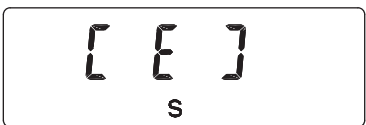
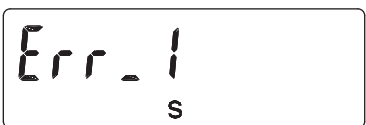
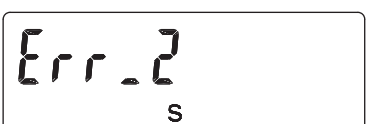
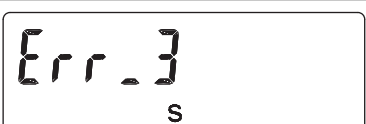
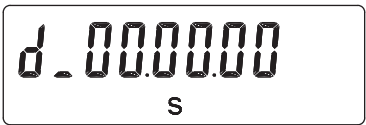
Icons	Definition	Description
	Heat Symbol	Indicates the displayed value is heat energy.
	Battery Alarm Symbol	Indicates the battery needs to be replaced.
	Cooling Symbol	Indicates the displayed value is cooling energy.
	Info Menu Symbol	Indicates the current menu is the information menu.
	Test mode symbol	Appears together with "t" to indicate the meter is in test mode.
	Test mode symbol	Appears together with "F" to indicate the meter is in test mode.

6.2.3 Display menu description

Serial Number	Example	Item	Description
1		Accumulated heat consumption	Accumulated heat consumption is displayed as 25 kW·h.
2		Full-screen display	All LCD segments are illuminated as shown.
3		Accumulated cooling consumption	Accumulated cooling consumption is displayed as 000 kW·h.
4		Power	Instantaneous power is displayed as 0.00 kW.
5		Accumulated volume	Accumulated volume is displayed as 0.00 m³.
6		Instant flow rate	Instantaneous flow rate is displayed as 0.800 m³/h.
7		In temperature	Inlet temperature is displayed as 28.22 °C.
8		Return temperature	Return temperature is displayed as 28.22 °C.
9		Temperature difference	Temperature difference is displayed as 0.00 °C.
10		Accumulated working hours	Accumulated working hours are displayed as 00 h.
11		Meter serial number	Meter serial number is displayed as 20680082.
12		Nominal diameter	Meter size is displayed as DN50.

Serial Number	Example	Item	Description
13		Software version	Software version is displayed as u-A.2.5A.
14		Information menu	The display is currently in the information menu.
15		Current time	Current time is displayed as 10:58:20.
16		Current date	Current date is displayed as 2018.08.23.
17		Historical data	Historical data for 2018.07.31 is being displayed.
18			
19		Total 38 months data	Historical data for 2015.06.30 is displayed, covering 38 months in total.
20		Accumulated heat consumption (kWh)	Accumulated heat consumption is displayed as 0.00 kW·h.
21		Volume (m³)	Accumulated volume is displayed as 0.00 m³.
22		Accumulated cooling consumption (kWh)	Accumulated cooling consumption is displayed as 0.00 kW·h.
23		Primary address	The primary address identifier is P-Adr.
24		Primary address value	Primary address value is displayed as 000000.
25		Secondary address	The secondary address identifier is S-Adr.

Serial Number	Example	Item	Description
26		Secondary address value	The value of the secondary address is 12345678.
27		Installation location: supply side	Installation side is IN, indicating the supply / inlet side.
28		Return side	Installation side is OUT, indicating the return / outlet side.
29		Nominal diameter	Meter size is displayed as DN50.
30		Software version	Software version is displayed as u-A.2.5A.
31		Test menu	The system is currently in Test Menu mode.
32		Accumulated volume	Accumulated volume in test mode is displayed as 0.00000 m³.
33		Accumulated heat consumption	Accumulated heat consumption in test mode is displayed as 0.000 kW·h.
34		Instantaneous flow rate	Instantaneous flow rate in test mode is displayed as 0.000 m³/h.
35		In temperature	Inlet temperature in test mode is displayed as 28.22 °C.
36		Return temperature	Return temperature in test mode is displayed as 28.22 °C.
37		Temperature difference	Temperature difference in test mode is displayed as 0.00 °C.
38		Ultrasonic time difference	Ultrasonic time difference is displayed as 00 0000.

Serial Number	Example	Item	Description
39		Forward flow time	Downstream ultrasonic transit time is displayed as r 0000 Ft.
40		Reverse flow time	Upstream ultrasonic transit time is displayed as l 0000 Ft.
41		Error message menu	The display is currently in the error / fault diagnosis menu (indicated by [E]).
42		Abnormal power supply	Error code Err_1 is displayed, indicating abnormal power supply.
43		Abnormal Inlet temperature	Error code Err_2 is displayed, indicating abnormal inlet temperature.
44		Abnormal outlet temperature	Error code Err_3 is displayed, indicating abnormal outlet temperature.
45		Abnormal flow sensor	Error code Err_4 is displayed, indicating abnormal flow sensor.
46		Fault occurrence time	The meter records the exact time when a fault occurs, displayed as d_00.00.00.
47		Accumulated Heat at time of last error	Accumulated heat at the time of last error is displayed as 0.00 kWh.
48		Accumulated volume at time of last error	Accumulated volume at the time of last error is displayed as 0.00 m³.
49		Accumulated cold at time of last error	Accumulated cooling at the time of last error is displayed as 0.00 kWh.

7. Rated operation conditions

- Flow range: $Q_{\min} \leq Q \leq Q_n$.
- Working environment temperature range: $-25^{\circ}\text{C} \sim 55^{\circ}\text{C}$.
- Water temperature range: $4^{\circ}\text{C} \sim 95^{\circ}\text{C}$.
- Working environment humidity range: $\leq 93\% \text{RH}$.
- Working pressure range: $0.03 \text{ MPa} \sim 1.6 \text{ MPa}$.

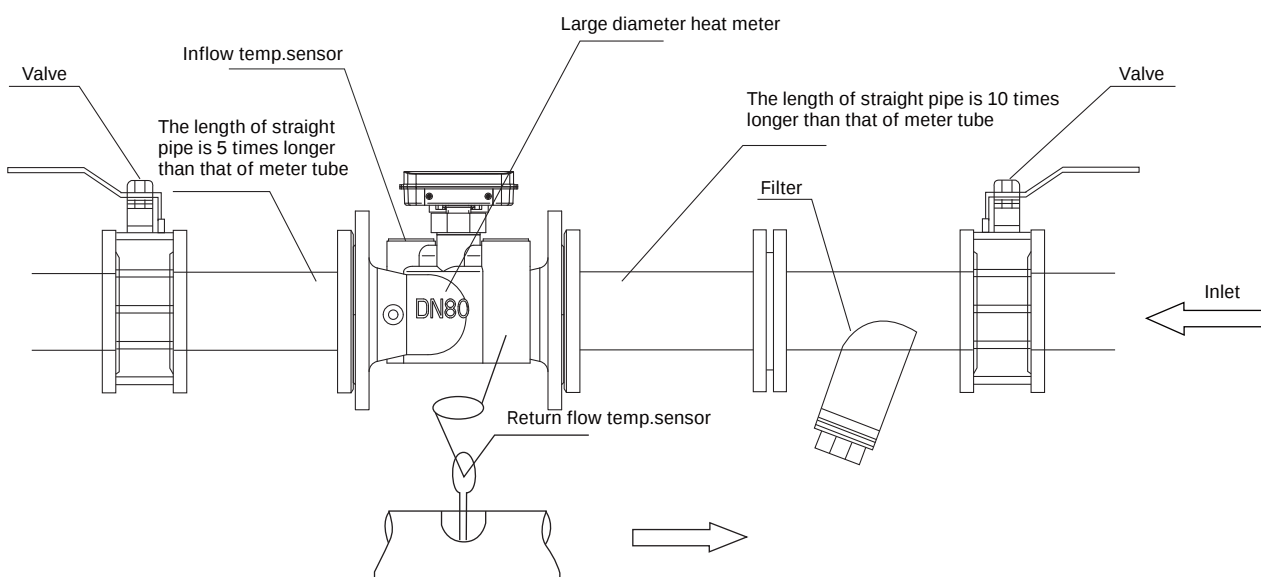
8. Actively report the abnormal information of the meter

- Battery level detection: When the battery is low, the LCD will display , indicating that the battery needs to be replaced.

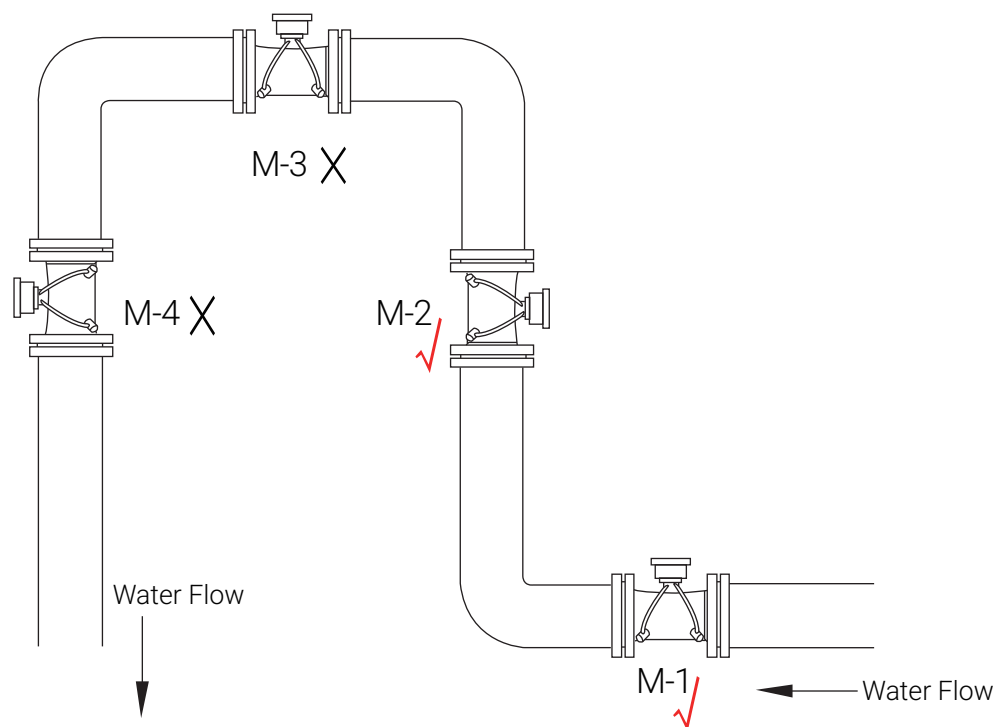
9. Installation and Attentions

1. Heat meter must be installed in dry accessible place.
2. Using professional installation tools to install the heat meter.
3. The heat meter both can be installed in Inflow pipe or Return flow pipe (factory default installed in the inflow pipe, if need to install on the return pipe, must be clearly indication before the factory during the production). When installation, should pay attention to the flow direction of medium is as the same as the arrow on the heat meter pipe body.

Special note: no matter the heat meter installed on inflow pipe or return flow pipe, the temperature sensor should be properly connected (red label for inflow pipe, blue label for return pipe).



4. The filter must be installed before the inlet of the heat meter according to the requirements of the specification; Filters must be cleaned and maintained regularly.
5. After installing the heat meter, pipes and warm pass pipe must be cleaned; At the end of inlet part the pipe length can't less than 10 times of the heat meter pipeline length, at the end of outlet shall not less than 5 times of the heat meter pipeline length. When installed at the confluence of two backwater pipelines, the straight pipe section with 10 times diameters of the heat meter from the connector (such as T-joint) is required.
6. The installation position of heat meter
 - ◇ In the pic, the M-1, M-2 show the right installation (M-1 is horizontal installation M-2 is vertical installation), The heat meter installed in the bottom of the pipeline, there is back pressure behind the meter, won't produce bubbles affect measurement accuracy.
 - ◇ In the picture, M-3, M-4 show the wrong installation, M-3 easy to accumulate bubbles, affects the accuracy of measurement, M-4 although vertical installation, but there is not back pressure in the behind of meter, may cause the fluid cannot be completely full of pipes, affect measurement accuracy.



7. The best installation position is the horizontal installation of the heat meter, which is beneficial to the normal operation of the meter.
8. the temperature sensor should be installed carefully, Don't pull too hard, and the fixed bolts should not be too tight, to prevent the break the thread and seal ring. In order to ensure the accuracy of the meter, the cable of the temperature sensor of the heat meter shall not be shortened or lengthened (the standard cable is 3 meters, if the wire length is not enough, please explain before ordering).

10. Acceptance requirements

1. After the installation of the heat meter, the pipe shall be cleaned. The heat exchange system shall conduct cold water circulation flushing in the right direction. The above process shall be repeated until the whole system pipe is cleaned and free of sundries and confirmed.

2. When the system is under pressure, no leakage occurs in the pipeline of the whole system, and the instantaneous flow and cumulative flow of the meter are normal.
3. The air humidity in the instrument box or pipe well where the heat meter is located shall not exceed 85%. When the above acceptance requirements are met, the heat measure system can be accepted for use.

11. Troubleshooting

The Heat meter shown as .

This indicates insufficient battery power and requires battery replacement.

12. Transportation and storage

1. The heat meter should be stored in the original package, the ambient temperature is 5-55℃, and the air is free of corrosive gases.
2. When heat meters are stored on shelves, the stacking height of the boxes should not exceed 1.5 meters.
3. During transportation, avoid being squeezed by heavy objects to prevent damage to the heat meter.

13. Warranty terms

1. The warranty period for this heat meter is 6 years.
2. Within 6 years of using our company's heat meter, if the installation is reasonable and the heat meter is used under its rated conditions, and if there is any damage or malfunction to the components (excluding freezing damage) caused by manufacturing quality, our company is responsible for repairing or replacing them while maintaining the integrity of the lead seal.

14. After-sales services

1. Our company provides lifelong after-sales service for heat meters.
2. When there is a quality problem with the heat meter, the user or manager should first provide feedback to the after-sales service department of our company and seek solutions to the problem. Without the permission of our after-sales service personnel, it is not allowed to damage the lead seal or open the heat meter without authorization.
3. During the warranty period, if the heat meter is damaged or malfunctioning (excluding freezing damage) due to manufacturing quality, our company will be responsible for repairing or replacing it free of charge while maintaining the integrity of the lead seal. After exceeding the warranty period, our company provides paid services.