RS485 Ultrasonic Heat Meter User Manual

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Document Revision History

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V1.0.0	2024-01-04	ZZY	First release of this document

1. Product Introduction

IoT communication technology has the advantages of long communication distance, low power consumption, low cost, anti-interference, low peak current, and flexible deployment.It is widely used in various IoT scenarios at home and abroad.

The ultrasonic heat meter produced by our company consists of an ultrasonic transducer, a temperature sensor, a calculator (integrator), a LoRaWAN communication It is composed of communication modules and other components. It has the characteristics of compact structure and easy installation. It uses high-quality piezoelectric ceramic transducers to ensure high accuracy and stability; No mechanical movement, no wear, not susceptible to bad water quality and low maintenance cost; can be installed horizontally or vertically, through LoRaWAN wireless communication Communication technology is used to transmit data to the system platform to realize remote reading and centralized management of data.

2. Features

1) Use picosecond-level high-precision chips, high measurement accuracy and small starting flow; high-precision platinum thermal resistors, accurate temperature measurement.

2) ultrasonic heat supports regular reporting of various heat meter data to the system platform. Including: daily heat, cumulative heat, daily cooling, cumulative cooling, thermal power, cumulative flow, instantaneous flow, inlet water temperature, return water temperature, working hours, and alarm time. The system platform can also send parameter setting commands to meet the needs of different applications. During data communication, the device maintains extremely low current consumption, which can greatly extend the battery life. service life.

3) Real-time monitoring of battery, temperature, flow and other status, and the ability to generate judgments and alarms when abnormalities such as undervoltage, temperature, and empty pipe occur.

4) The real-time clock function is integrated internally, with high timing accuracy. The device will automatically calibrate the network time when reporting data.

5) It has power-off monitoring function to save metering data in time to prevent accidental loss.

3. Working Principle

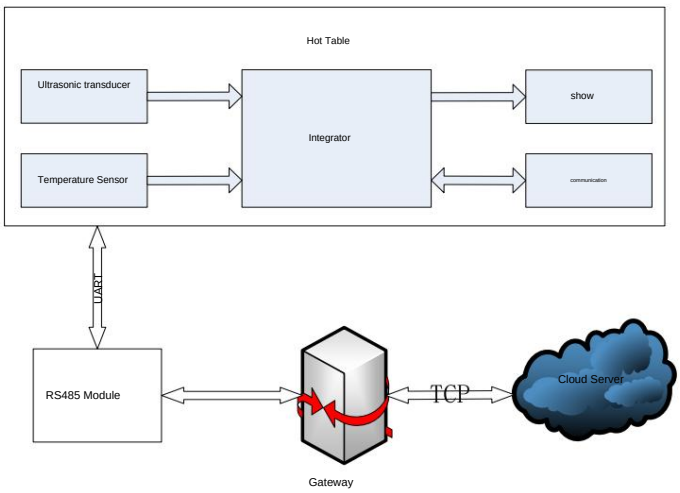


Figure 1 Principle Block Diagram

4. Technical indicators

1. Technical parameters

performance	parameter
Tested medium	Domestic water (other liquids need to be customized) and fill the pipes
Power supply	DC3.6V (disposable lithium battery)
mode Maximum water volume	999999.99
reading (m3) Maximum heat reading	99999999
(kW·h) Accuracy level	Level 2
Range Ratio	R50 (optional R100)
Nominal diameter	DN15ÿDN40
Pressure loss	ÿ25kPa(at normal flow rate)
Heat consumption calculation	Start with 1K
Temperature range	3ÿ75K
Temperature measurement	4ÿÿ95ÿ
range Temperature	0.01ÿ
resolution	Category A
Environmental grade Temperature sensor	PT1000 Platinum resistance
Communication	LoRaWAN
Protection level	IP68

2. Flow range

performance	Parameters (R50)		
Nominal diameter	Minimum flow rate (m³/h)	Common flow rate qp (m³/h)	Maximum flow rate qs(m³/h)
DN15	0.03	1.5	3
DN20	0.05	2.5	5
DN25	0.07	3.5	7
DN32	0.12	6	12
DN40	0.2	10	20

5. Display information

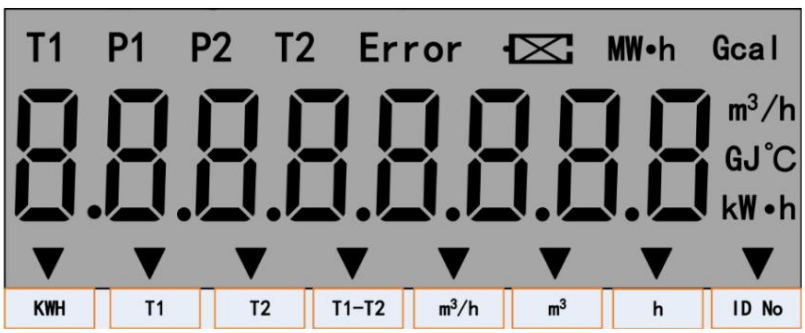


Figure 2 Schematic diagram of the display screen

symbol	describe
	Battery undervoltage
Error	Temperature sensor alarm

6. Dimensions

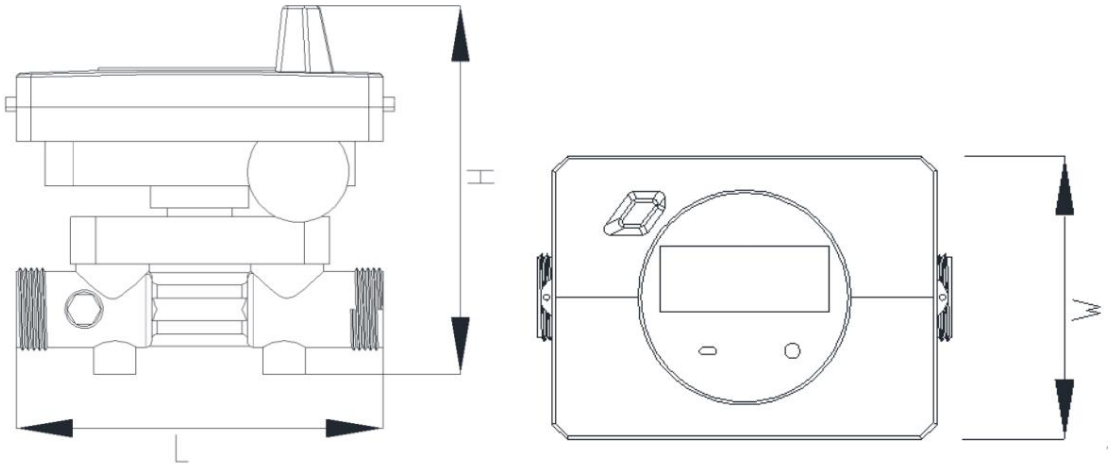


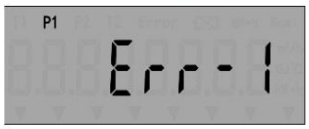
Figure 3 Schematic diagram of HWRL-A

Nominal diameter	Length L (mm)	Width W (mm)	Height H (mm)	Thread D (mm)
DN15	110	108	124	G3/4B
DN20	130	108	131	G1B
DN25	160	108	139	G1-1/4B
DN32	180	108	145	G1-1/2B
DN40	200	108	157	G2B

7. Operating Instructions

Short press the button to switch menus. The menu interfaces are as follows

Serial number	Menu Name	Menu Display
1	Accumulated heat	
2	power	
3	Inlet temperature	

4	Outlet temperature	
5	Temperature difference	
6	Accumulated cooling capacity	
7	Fault Information	

Note:

1) The screen will automatically return to the "Accumulated Heat" interface if there is no operation for 1 minute, and will automatically turn off the screen if there is no operation for 3 minutes.

2) On the "Accumulated Heat" interface, press and hold the button for more than 1.5 seconds, and release it when you see the "UPLOAD" character on the display to trigger data upload.

3) On the "Accumulated Cooling Capacity" screen, press and hold the button for more than 6 seconds, and release it after seeing the "CLE" character on the display. Repeat this operation twice to clear the accumulated cooling capacity.

Except the number of reports.

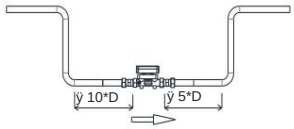
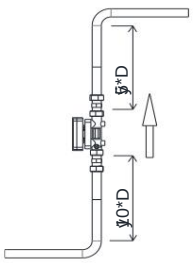
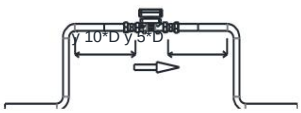
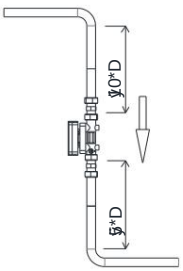
8. Installation Instructions

8.1 Select the installation point

During installation, avoid locations with flow field disturbances or sudden changes, and reserve a corresponding length of straight pipe section according to the requirements for straight pipe section length on the heat meter nameplate.

For example: the nameplate requirement is "U10D5", which means the upstream straight pipe length is ÿ10D, the downstream straight pipe length is ÿ5D (D is the nominal diameter), and the water

Fill the pipe.

Recommended mounting points		Disable Mount Points	
			
ÿ At the lowest point in the piping system to ensure full pipe. ÿ Pipe section with vertical upward or oblique upward flow.		ÿ The highest point in the piping system may not be full. ÿ A pipe section where the flow is vertically downward or obliquely downward.	

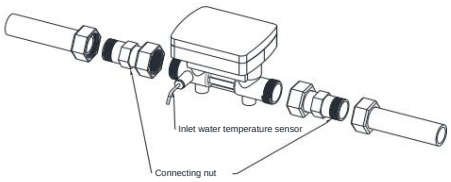
Note: The arrow indicates the direction of fluid flow.

8.2 Installation Method

Take the water inlet installation method as an example:

1. Cut off the pipe and leave a place for installation. Wrap the raw tape around the threaded connection.

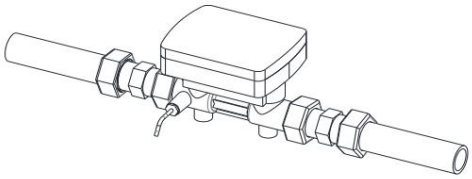
Connect the pipe thread interface with the pipe nut and the heat meter and tighten them, as shown in the figure:



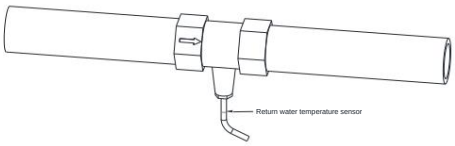
Pay attention to whether the flow direction arrow on the meter is consistent with the actual fluid.

2. Align the heat meter with the pipe and accessories concentrically, and use a wrench to tighten each

Tighten the connection. As shown in the figure:



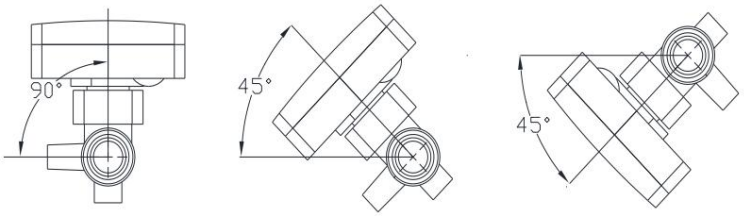
3. Return water temperature sensor installation: Install a tee with a temperature sensor threaded interface on the return water pipe end or drill a hole in the pipe to install the temperature sensor.



4. Installation angle: When choosing the installation angle of the heat meter, you should consider whether the heat meter can be easily read. Usually, vertical installation of the heat meter can provide clearer reading.

The heat meter should be installed at a 45° angle to ensure clear and convenient readings.

When the heat meter is installed at a higher position, it can be tilted 45° downward to facilitate reading. The recommended installation angle is shown in the figure below:



High-altitude installation

8.3 Installation Notes

1) The pipe diameter and flow rate at the installation location should be used as the basis, and the pipe flow rate should be equal to or less than the common flow rate of the heat meter to select the appropriate port.

Heat meter of diameter;

2) The heat meter should be installed in a suitable location, away from heat sources, strong radiation and corrosive environments; it should be away from exposure to the sun, rain, flooding and environments with strong

magnetic field interference;

3) The heat meter has built-in precision devices. When disassembling and assembling the heat meter, it should be handled with care and should not be dropped on the ground to avoid damage;

4) To ensure the accuracy of measurement, reserve a straight pipe section of corresponding length according to the requirements on the straight pipe section length on the heat meter nameplate;

5) When installing, the arrow direction of the base meter or pipe section must be consistent with the direction of water flow, and the LCD display must face upwards for easy operation;

6) During installation (especially for newly installed pipe sections), avoid hemp, raw tape, adhesive tape, sand and gravel and other debris entering the heat meter pipe, which may cause valve failure or measurement error;

7) During installation, the heat meter and water pipes should be insulated to reduce heat loss.