

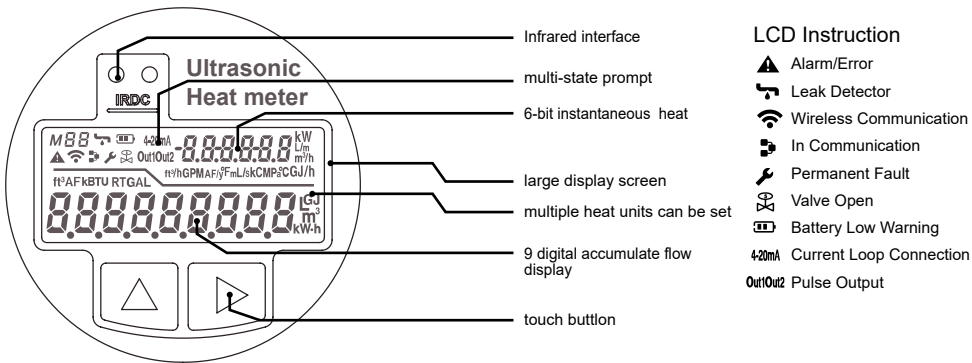
# Ultrasonic heat Meter

## Quick Installation and Operation Instructions

Welcome to use the Ultrasonic Heat Meter.

The ultrasonic heat meter is a newly developed product with low cost, high measurement accuracy, small power consumption, stable and reliable characteristics, which is according to GB/T32224-2020 and the other standards, based on ultrasonic time-deference measurement technology.

### 1.Parts Descriptions



### Protection Lid

### Label

### Protection cover

### PT

### Signal Cable

RED DC8-24V+  
BLACK DC8-24V-  
YELLOW RS485+  
GREEN RS485-

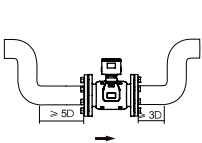
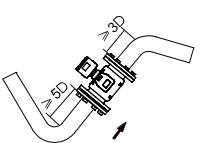
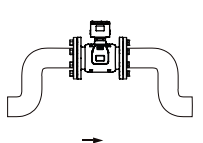
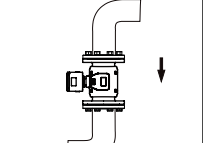
### Caliber

### Flow parameters

## 2.Installation Instructions

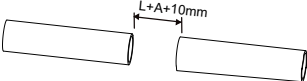
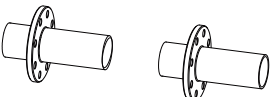
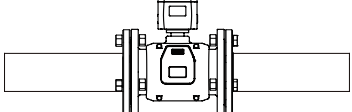
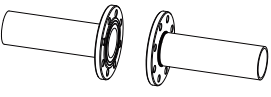
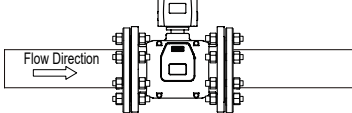
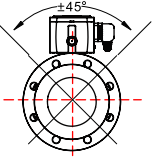
### 2. 1 Choosing install position

When install the heat meter, the upstream straight pipe line should be  $\geq 5D$ , downstream straight pipe line should be  $\geq 3D$ ,  $20D$  from the pump( $D$  is the pipe diameter), and ensure water must be full of the pipe lines.

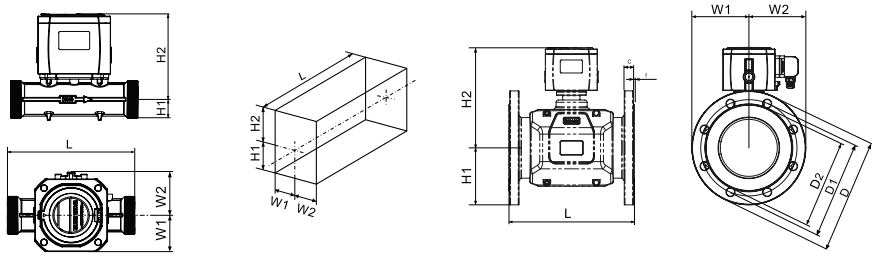
Correct installation point		Wrong installation point	
			
Lowest point of the pipe line, water be full of the pipe. Flow is vertically or obliquely upward Upstream straight pipe line $\geq 5D$		Highest point of the pipe line, water would be not full of the pipe.Flow is vertically or obliquely downward. Upstream straight pipe line $\leq 3D$ .	

► Note:Arrow direction is the flow direction.

### 2. 2 Installation Method

<p>1.Confirm installation size</p> <p>Pipe line length <math>\begin{cases} \text{water meter thickness } L \text{ mm} \\ \text{2pcs seal gasket thickness } A \text{ mm} \\ \text{Reserve space is } 10\text{mm} \end{cases}</math></p> 	<p>2.Install companion flange</p> 
<p>3.Fixed flange</p> <p>Install water meter with 3 screws to fix the flange averagely, then spot welding.</p> 	<p>4.Weld flange</p> <p>Take out water meter and weld flange.</p> 
<p>5.After cooling install with seal gasket, and tighten screws.</p> <p>► Make sure the direction sign on water meter is same with the rael flow direction.</p> 	<p>6.Installation angle</p> <p>Top of the pipe line may be not full of water, suggest to install the water meter on vertical direction of pipe line within a <math>\pm 45^\circ</math> degree angle, please refer to attached picture.</p> 

2.3 Water Meter Dimension



Nominal diameter (mm)	Dimension (mm)								Thread Connection		thread length		Pressure MPa	Weight kg
	L		H1		H2		W1	W2	Pipe screw thread A	Pipe screw thread B				
	copper	stainless steel	copper	stainless steel	copper	stainless steel					copper	stainless steel		
DN15	165	165	14	13.5	123	121	57	130	G3/4B	G3/4B	10	12	1.6	1.5
DN20	195	190	18	17	125	124	57	130	G1B	G1B	12.5	18	1.6	1.5
DN25	160	180	22	21	127.5	126.5	57	130	G11/4B	G11/4B	13	18	1.6	1.5
DN32	180	180	25	24	130	130	57	130	G11/2B	G11/2B	14.5	15	1.6	2
DN40	200	200	33.5	30	134	134	57	130	G2B	G2B	16	18	1.6	2.2

Nominal diameter (mm)	Dimension (mm)					Flange Dimension (mm)						Pressure MPa	Weight kg
	L	H1	H2	W1	W2	Flange Diameter D	Bolt Hole Center D1	Bolt hole xQuantity φxn	Sealing surface		Flange thickness C		
									D2	f			
DN50	200	82.5	210	82.5	108	165	125	18*4	102	2	19	16	10
DN65	200	92.5	219	92.5	108	185	145	18*4	122	2	20	16	11.5
DN80	225	100	227	100	108	200	160	18*8	138	2	20	16	13.5
DN100	250	110	237	110	110	220	180	18*8	158	2	22	16	18.5
DN125	275	125	250	125	125	250	210	18*8	188	2	22	16	23.5
DN150	300	142.5	263	142.5	142.5	285	240	22*8	212	2	24	16	30

Nominal diameter (mm)	Dimension (mm)					Flange Dimension (mm)						Pressure MPa	Weight kg
	L	H1	H2	W1	W2	Flange Diameter D	Bolt Hole Center D1	Bolt hole xQuantity φxn	Sealing surface		Flange thickness C		
									D2	f			
DN200	350	170	287	170	170	340	295	22*12	268	2	26	16	35.5
DN250	450	200.5	314.5	200.5	200.5	405	355	26*12	320	2	29	16	58
DN300	500	230	340	230	230	460	410	26*12	378	2	32	16	76
DN400	600	290	410	290	290	580	525	30*16	490	4	38	16	145

### 3.Menu Instruction

#### 3.1 Operation Method

There are two capacitive touch keys on the water meter surface, which are indicated as ▲ and ►.

▲ :scroll up; change number; active keys and display (press for 5 seconds).

►:scroll down; move modify cursor.

▲ ►: slide from ▲ to ► , enter to next step menu; confirm the operation.

►▲: slide from ► to ▲,quit the current menu.

#### 3.2 Windows Display and Menu Instruction

There are 4 main menu options for the water meter

E.g. in the main menu M-0, press the modifying key ▲► will enter in the sub menu M-01, press► will display sub menu M-02. Press ►▲ will return to the main menu M-0.

M-0: measured value and work condition, for short DISP		M-1:pipe parameter and history searching, for short CHEC	
M00	Display instantaneous flow rate and net accumulated flow rate (water meter)	M10	Password enter for current menu
M01	Display heat flux and accumulated heat flux (Calorimeter)	M11	Display channel number,prober distance, inside diameter
M02	Display hydraulic pressure and water temperature	M12	Display acoustic sampling time, damping coefficient, angle coefficient
M03	Display supply water temperature T1 and return water temperature T2	M13	Display negative accumulation
M04	Display signal intensity and battery voltage	M14	Display daily net accumulation
M05	Display total propagation time(microsecond) and propagation time difference(nanosecond)	M15	Display monthly net accumulation
M06	Display date, time, week	M17	Display total working time and fault working time
M07	Display Calibration window	M18	Display production date (calibration read in), Calibration work number
M08	Batch controller (irrigation controller)		
M09	Display Instrument serial number and software version number		
M0A	Display the whole screen		
M-2: Communication Setting, for short COM		M-3: Flow Rate Setting and Modification, for short CORR	
M21	Set date, time, week	M32	Display current zero value, low flow excision value
M24	Set RS485 communication address	M33	Set instrument coefficient
M25	RS485/MBUS communication baud rate verify	M34	Set low flow excision value
M26	Communication data display for debugging	M35	Reset accumulator (modify cumulant)
		M36	Display instantaneous flow rate and static state zero setting
		M37	Manual correction of water supply temperature T1
		M38	Manual correction of water supply temperature T2
		M3A	Set the scale of positive/negative accumulated heat retention on the heat meter
		M3C	Set the heat unit manually

## 4. Technical Parameter

### 4.1 Flow Parameter

- single channel industrial grade small calibre ultrasonic heat meter

Nominal diameter (mm)	Measurement range ratio R	Flow rate (m³/h)			
		Starting Flowrate	Minimum Flowrate Qmin	Maximum Flowrate Qmax	Permanent Flowrate Qp
DN15	100	0.0014	0.015	3	1.5
DN20	100	0.0023	0.025	5	2.5
DN25	100	0.0032	0.035	7	3.5
DN32	100	0.0054	0.060	12	6
DN40	100	0.0091	0.100	20	10

- dual channel big calibre ultrasonic heat meter

Nominal diameter (mm)	Measurement range ratio R	Flow rate (m³/h)			
		Starting Flowrate	Minimum Flowrate Qmin	Maximum Flowrate Qmax	Permanent Flowrate Qp
DN50	25	0.035	0.6	30	15
DN65	25	0.060	1.0	50	25
DN80	25	0.090	1.6	80	40
DN100	50	0.141	1.2	120	60
DN125	50	0.221	2.0	200	100
DN150	50	0.318	3.0	300	150
DN200	50	0.565	5.0	500	250
DN250	50	0.883	8.0	800	400
DN300	50	1.270	12.0	1200	600
DN400	50	2.117	20.0	2000	1000

- four-channel big calibre ultrasonic heat meter

Nominal diameter (mm)	Measurement range ratio R	Flow rate (m³/h)			
		Starting Flowrate	Minimum Flowrate Qmin	Maximum Flowrate Qmax	Permanent Flowrate Qp
DN80	100	0.036	0.40	80	40
DN100	100	0.057	0.60	120	60
DN125	100	0.088	1.00	200	100
DN150	100	0.127	1.50	300	150
DN200	100	0.226	2.50	500	250
DN250	100	0.353	4.00	800	400
DN300	100	0.509	6.00	1200	600
DN400	100	0.905	10.00	2000	1000

## 4. 2 Technology Parameter

Items		Parameters
Nominal diameter		DN15-DN400
Material quality		Nominal diameter<DN50: measuring tube:copper; Customizable stainless steel 304 or 316 Nominal diameter≥DN50: measuring tube:carbon steel(Stainless steel is used at the sensor);Customizable stainless steel 304 or 316
Executive standard		GB/T32224-2020
Measurement range	Temperature range	Nominal diameter<DN50:4-90℃; Nominal diameter≥DN50:4-130℃
	Temperature difference range	0-85 K (thermometric starting temperature difference 0.2K)
	Minimum pairing temperature error	±0.1 ℃
	Maximum working pressure	1.6MPa,2.5MPa optional
Accuracy grade		Grade 2
Temperature sensor type		PT1000,DIN/IEC751B
Protection grade		IP68
Working power supply		Powered by 3.6V lithium battery, each battery can work continuously for 6 years above. DC8-24V (Specify when ordering) AC220V, 50HZ (Optional power adapter, specify when ordering)
Working environment		Environment class A/ class B/class C/class D
power consumption		Standard state < 30uA. It can continuously work 20 years above mostly.
Communication data	Optical interface	Baud rates 9600bps, 4800bps, 2400bps, 600bps, 300BPS are optional, 9600bps is the default; Adopt GB/T 26831 protocol.
	RS485/M-BUS	Baud rates 9600bps, 4800bps, 2400bps, 600bps, 300BPS are optional,9600bps is the default; Transmission distances≤150m GB/T26831 protocol,CJ/T 188 protocol and Modbus RTU protocol are optional,the communication protocol is automatically identified.
	Wireless-communication	NB-IoT narrow-band Internet of Things
		4G network communication
Local display		Double-line display includes 9-digit cumulative quantity, 6-digit instantaneous flow,supply and return water temperature, temperature difference, cumulative effective running time.
Display resolution		Heat 0.1kw·h, cumulative flow 0.001m³,temperature 0.01℃; temperature difference 0.01K
Storage temperature		-25~55
Data storage		Ferroelectric storage parameters usage. Store heat, accumulated flow and relative time on monthly basis, recording accumulated flow of 31 months ago and 31 days ago automatically
Pressure loss level at common flow		Nominal diameter<DN50:△P40Nominal diameter≥DN50:△P10
Length of temperature sensor signal line		Nominal diameter<DN50:1.3m;Nominal diameter≥DN50:Standard configuration:5m (Other lengths need to be customized)
Installation position of Heat Meter		Water supply end(Specify when installing at the backwater end)

## 5. Calibration Method

The water meter is calibrated via constant-current method.

Constant-current method is to make the calibration device (standard water meter) and tested water meter into stable flow state at a set flow point, calibrate the water meter by measuring accumulative flow at the same time.

Different calibration methods may cause errors. If use start-stop method to calibrate the water meter, it may cause errors. Try to extend calibrating time when you use start-stop method to calibrate water meter, and make sure the duration of each turn on time should be more than 60 seconds at least. The less time you calibrate, then bigger error you will get.

## 6. Other

For other details please refer to the “ultrasonic water meter user manual”.