



Technical Description

SCL-61D

Ultrasonic Water Meter

Huizhong Instrumentation Co., Ltd.

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Safety Warning

Safety Warning

Please follow the safety precautions below and use this product correctly to avoid economic loss and personal injury!

1. The meter is a precision device and must be operated by professional technician.

2. Battery-related points for special attention:

- The battery is non-rechargeable. Never short circuit or retrofit it without permission.
- Never allow battery to get overheated or soldered up.
- Keep battery away from flame or water.
- Protect battery against strong physical impact.
- The battery has undergone special treatment. Never use any battery of the same type for replacement.
- When battery power is low, replace it in time. Otherwise, meter-measured data may get lost. The battery must be replaced by trained personnel or by Huizhong, if the meter is sent back to Huizhong by user.
- The replaced battery should have its electronic contacts insulated using adhesive tape for avoiding fire or explosion hazard caused by their contact with other metallic objects or battery.
- The used battery should be treated for environmental protection or sent to Huizhong for unified recovery and treatment.
- If the battery is found to have leakage, color change, deformation, or flare up or send forth a peculiar smell, remove it immediately and avoid skin burn while doing so.
- Never allow the battery's leakage to contact your eyes, skin or clothes. This may cause, in severe cases, loss of sight and skin injury. In case of contact of your eyes, skin or clothes with battery leakage, lose no time to wash them with plenty of fresh water (Do not try to rub your affected part) and immediately seek medical advice.

3. Don't alter the length of any cable. Otherwise meter performance is affected.

4. Keep any cable or wire away from heat. If not, the insulation layer of cable may



Safety Warning

be damaged due to deformation of cable under heat, which can lead to fire hazard or electric shock accident.

5. Handle the meter carefully for avoiding skin injury caused by contact with any bare threads.
6. The wireless remote data reading system operates in GPRS or GSM communication mode. Please obey the local relevant laws or regulations.
7. Try as much as possible not to use the meter under acid environment or at places with heavy salt fog as such environmental factors may accelerate ageing of manufacturing materials and cause the failure to comply with health standard.
8. The meter is a precise device and must be protected against dropping or impact.
9. Protect meter's display panel against long-time exposure to direct sunshine.

1 General Description

1.1 Working Principle

SCL-61D Ultrasonic Water Meter works by detecting the velocity of ultrasound in flowing fluid. It is generally considered that the actual velocity of ultrasound is determined by (1) flow velocity in resting state (c_f) and (2) division of average flow velocity (v_m) in the direction of ultrasound transmitting. As shown in Picture 1-1, the relationship of downstream and upstream transmitting time and other values are:

$$t_{down} = t_{AB} = \frac{L}{(c_f + v_m \cos \phi)} \quad t_{up} = t_{BA} = \frac{L}{(c_f - v_m \cos \phi)} \quad (1-1)$$

of which, t_{down} — Time of downstream flow

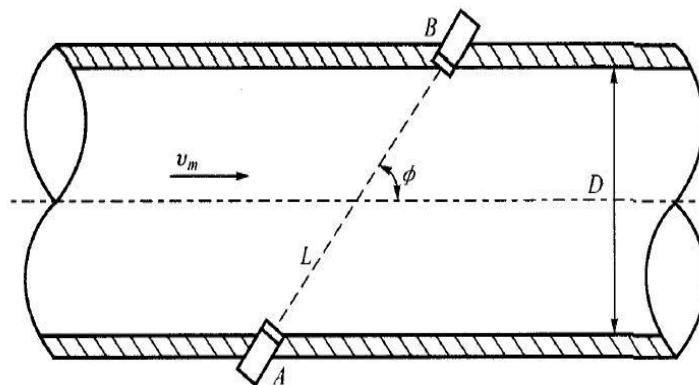
t_{up} — Time of upstream flow

L — Length of ultrasound transmitting;

c_f — Flow velocity of ultrasound in resting state

v_m — Average flow velocity in the direction of ultrasound transmitting;

ϕ — Angle of ultrasound transmitting



Picture 1-1 Measurement Principle D

Expression of fluid flow velocity according to Expression (1-1):

$$v_m = \frac{L}{2 \cos \phi} \left(\frac{1}{t_{down}} - \frac{1}{t_{up}} \right)$$

Expression of ultrasonic wave transmitting speed:

2 Technical Parameters

$$c_f = \frac{L}{2} \left(\frac{1}{t_{down}} - \frac{1}{t_{up}} \right)$$

In consideration of flow area S , the flow volume q_v is calculated as below:

$$q_v = S \cdot v_m$$

Meanwhile, the meter records the time fluid flow through the pipe, cumulate the Instant flowrate per second, round it if less than 1 second.

1.2 Technologies, Features and Applications

Technologies	Features
Ultrasonic Technology	<ul style="list-style-type: none">✓ High reliability✓ High accuracy✓ Low starting flow✓ High dynamic range up to R800✓ Free of electromagnetic impact✓ No moving mechanical parts
Micro power consumption	<ul style="list-style-type: none">✓ Long lifetime✓ Low operating cost
IP68	<ul style="list-style-type: none">✓ 100% water proof✓ Free of impact under water
Multi-Channel	<ul style="list-style-type: none">✓ Minimized impact from complex flow✓ High accuracy
Integrated Communication	<ul style="list-style-type: none">✓ Stable transmission✓ Multi-choice for communication✓ Possibility of big data
Stainless Steel	<ul style="list-style-type: none">✓ Maintenance free✓ Safe recycling✓ Eco-friendly
Online Self-verification	<ul style="list-style-type: none">✓ Real time operation status✓ Free of recalibration risk

2 Technical Parameters

Other Integrated Sensors	<ul style="list-style-type: none">✓ Temperature✓ Pressure as optional
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Applications	
Commercial and Industrial	<ul style="list-style-type: none">✓ Community building✓ Hospital✓ School campus✓ Mall✓ Public building✓ Factory✓ Urban fire system
Water Supply Network	<ul style="list-style-type: none">✓ Main pipe✓ Sub pipe✓ DMA

2 Technical Parameters

2 Technical Data

2.1 General Technical Parameters

Table 2-1 SCL-61D Ultrasonic water meter technical parameters

Technical Items	Technical Parameters		
Fluid	Full pipe of Water, sewage or homogeneous fluids		
Accuracy Class	Class 1	Class 2	
Dynamic Range	R500	R500	R800
Diameter Range	DN50~DN300	DN50~DN300	DN50~DN300
Max. Pressure	1.0MPa/1.6MPa/2.5MPa		
Class of Pressure Loss	$\Delta p 10$		
Working Environment	$-25^{\circ}\text{C}\sim 55^{\circ}\text{C}$, $\leq 100\%RH$		
Temperature	T30, T50, T70, default is T30		
Upstream	U0		
Downstream	D0		
Climate Environment	Class O		
Mechanical Environment	M1		
Electromagnetic Compatibility	E2		
Button	Magnetic Induction Button		
Display Screen	LCD 9-digit + prompting characters, height 12 mm		
Display on Screen	Cumulative (total) volume (m^3) Instant (real time) flowrate (m^3/h) Cumulative (total) operating time (h) Date (Year/Month/Day) Time (Hour/Minute/Second)		

2 Technical Parameters

		Software version Temperature (°C)
Display Range		Cumulative volume (m ³): -99999999.9 ~ + 99999999.9 Instant flowrate (m ³ /h): -99999.999 ~ + 99999.999
Communication		Photoelectric Interface
		RS-485/M-Bus
		(4-20) mA
		Pulse
		NB-IoT
		Radio Frequency
		GPRS
Data Storage		EEPROM applied for cumulative volume and time Automatically storage latest 24 months data Saving for 100 years in power failure
Measuring Cycle		Once / Second
Power	Internal	Lithium battery powered DC3.6V
	External	DC10V ~ DC36V, ≥20mA (optional)
Power Consumption		< 0.4mW
IP Grade		IP68

2 Technical Parameters

2.2 Flowrate Range

Table 2-3 Flowrate Parameters (R500, Accuracy Class 1)

DN (mm)	Starting Flowrate $Q_s(m^3/h)$	Q_3/Q_1	Q_2/Q_1	Minimum Flowrate $Q_1(m^3/h)$	Transitional Flowrate $Q_2(m^3/h)$	Permanent Flowrate $Q_3(m^3/h)$	Overload Flowrate $Q_4(m^3/h)$
50	0.010	R500	1.6	0.080	0.128	40	50
65	0.015	R500	1.6	0.126	0.2016	63	78.75
80	0.024	R500	1.6	0.200	0.320	100	125
100	0.037	R500	1.6	0.320	0.512	160	200
125	0.057	R500	1.6	0.500	0.800	250	312.5
150	0.089	R500	1.6	0.800	1.280	400	500
200	0.128	R500	1.6	1.260	2.016	630	787.5
250	0.227	R500	1.6	2.000	3.200	1000	1250
300	0.354	R500	1.6	3.200	5.120	1600	2000

Table 2-4 Flowrate Parameters (R500, Accuracy Class 2)

DN (mm)	Starting Flowrate (m^3/h)	Q_3/Q_1	Q_2/Q_1	Minimum Flowrate $Q_1(m^3/h)$	Transitional Flowrate $Q_2(m^3/h)$	Permanent Flowrate $Q_3(m^3/h)$	Overload Flowrate $Q_4(m^3/h)$
50	0.010	R500	1.6	0.050	0.080	25	31.25
65	0.015	R500	1.6	0.080	0.128	40	50
80	0.024	R500	1.6	0.126	0.2016	63	78.75
100	0.037	R500	1.6	0.200	0.320	100	125
125	0.057	R500	1.6	0.320	0.512	160	200

2 Technical Parameters

150	0.089	R500	1.6	0.500	0.800	250	312.5
200	0.128	R500	1.6	0.800	1.280	400	500
250	0.227	R500	1.6	1.260	2.016	630	787.5
300	0.354	R500	1.6	2.000	3.200	1000	1250

Table 2-5 Flowrate Parameters (R800, Accuracy Class 2)

DN (mm)	Starting Flowrate (m ³ /h)	Q ₃ /Q ₁	Q ₂ /Q ₁	Minimum Flowrate Q ₁ (m ³ /h)	Transitional Flowrate Q ₂ (m ³ /h)	Permanent Flowrate Q ₃ (m ³ /h)	Overload Flowrate Q ₄ (m ³ /h)
50	0.010	R800	1.6	0.050	0.080	40	50
65	0.015	R800	1.6	0.07875	0.126	63	78.75
80	0.024	R800	1.6	0.125	0.200	100	125
100	0.037	R800	1.6	0.200	0.320	160	200
125	0.057	R800	1.6	0.3125	0.500	250	312.5
150	0.089	R800	1.6	0.500	0.800	400	500
200	0.128	R800	1.6	0.7875	1.260	630	787.5
250	0.227	R800	1.6	1.250	2.000	1000	1250
300	0.354	R800	1.6	2.000	3.200	1600	2000

2.3 Performance Error Curve

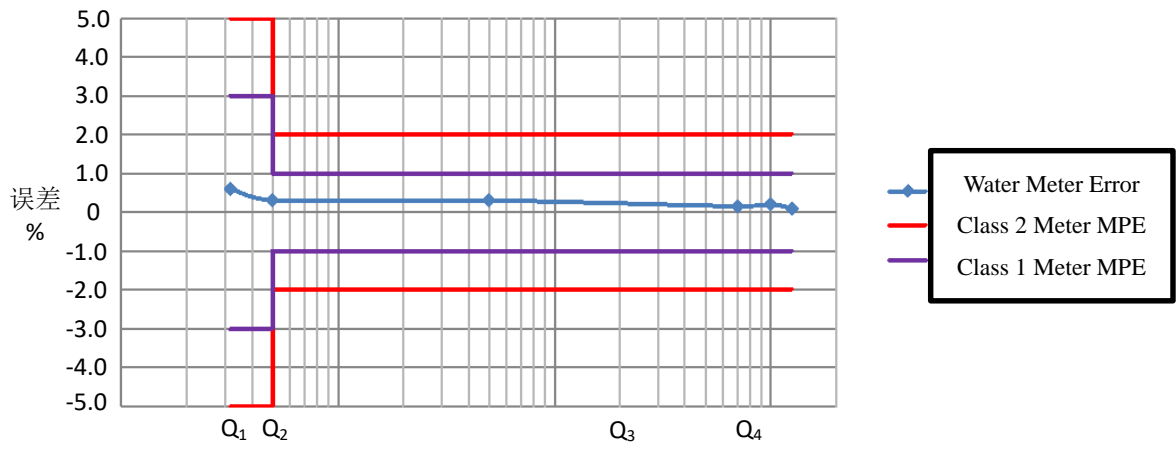


Figure 2-1 Performance Error Curve

3 Product Structure & Dimension

3.1 Product Structure

The calculator of SCL-61D Ultrasonic water meter includes plastic casing and metal casing.

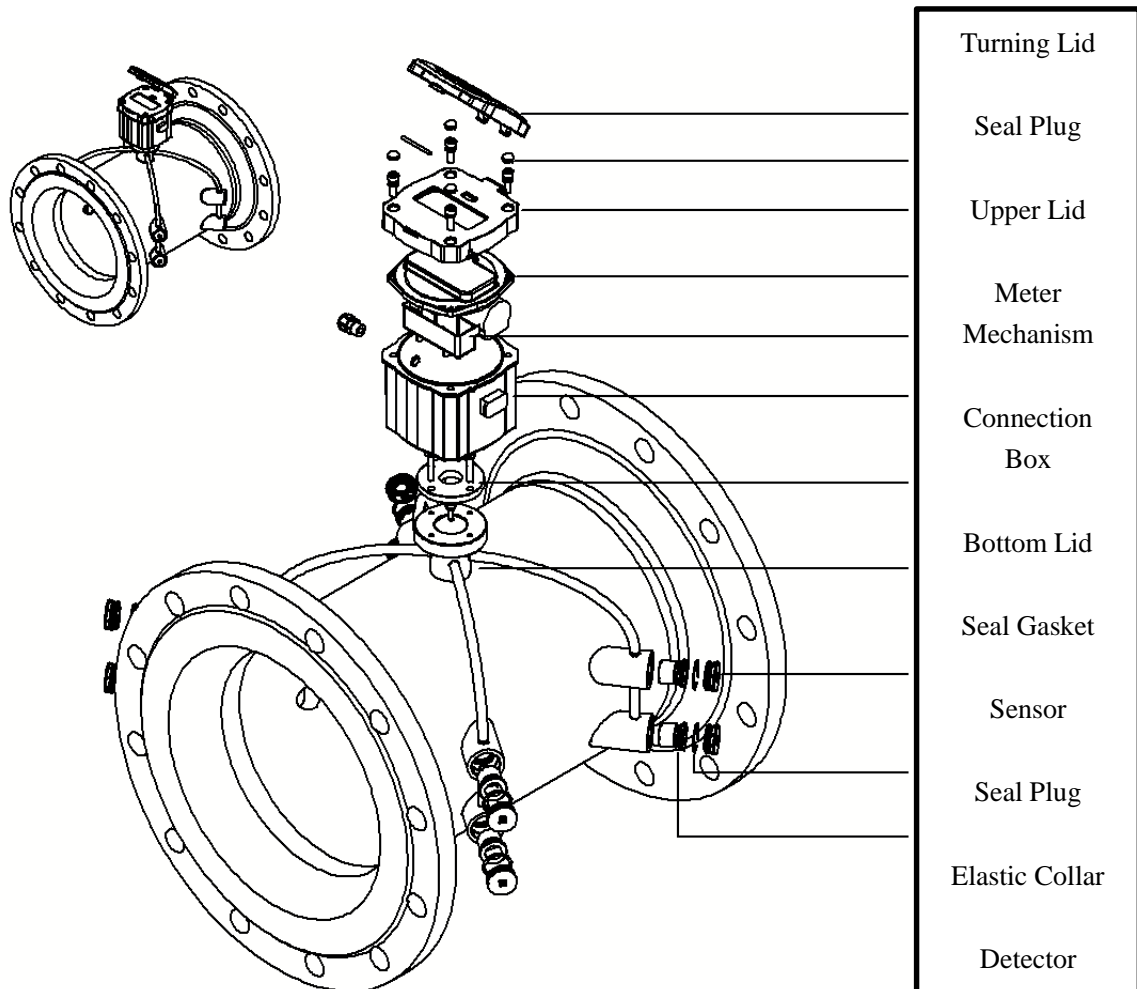


Figure 3-1 SCL-61D Ultrasonic Water Meter (plastic case) assembly

3 Product Structure & Dimension

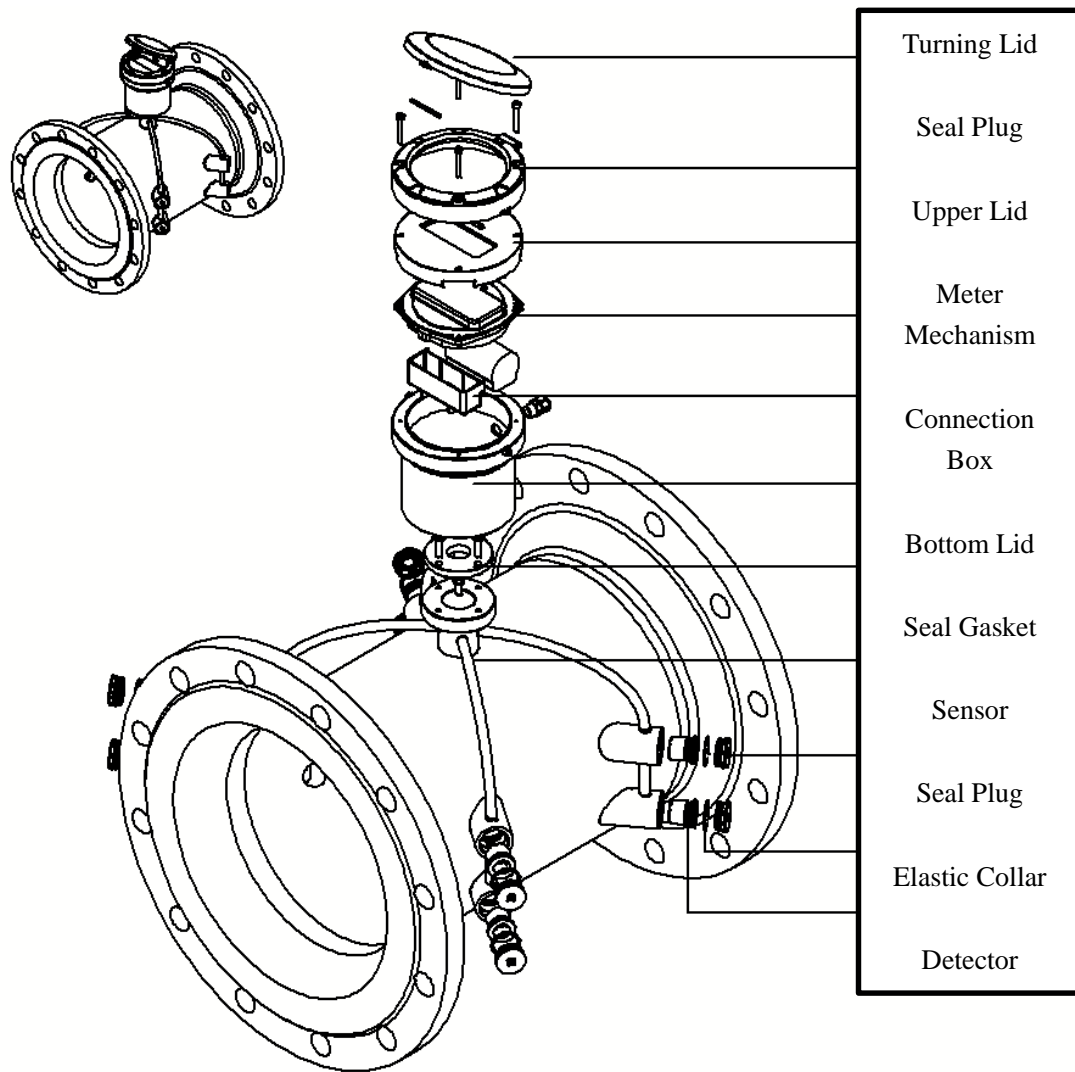
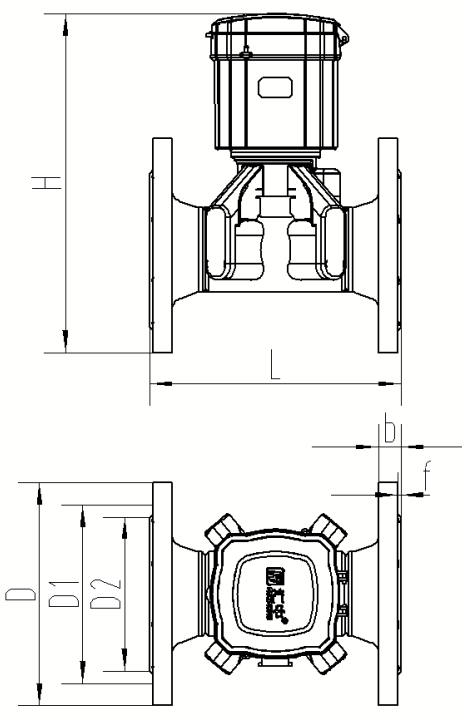
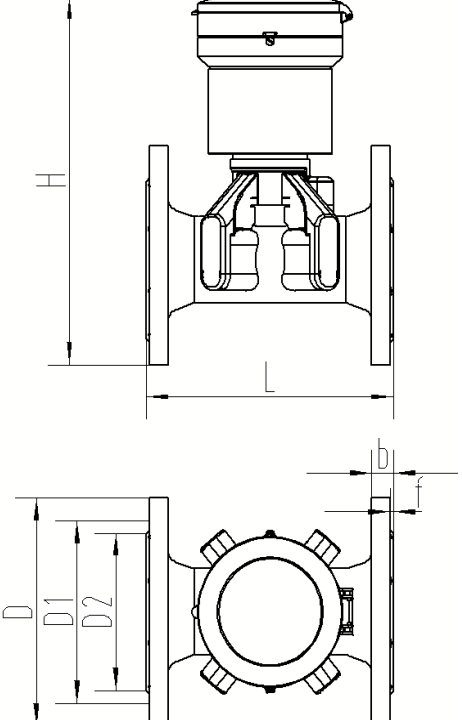
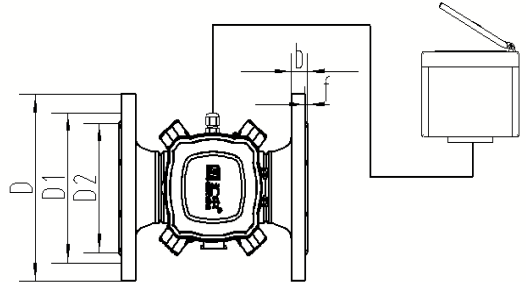
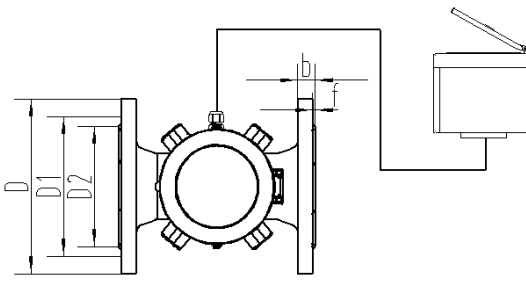


Table 3-1 SCL-61D Ultrasonic Water Meter (metal case) assembly

3 Product Structure & Dimension

3.2 Product Dimension

Combined	
	
SCL-61D Ultrasonic Water Meter (Plastic Casing)	SCL-61D Ultrasonic Water Meter (Metal Casing)
Separated	
	
SCL-61D Ultrasonic Water Meter (Plastic Casing)	SCL-61D Ultrasonic Water Meter (Metal Casing)

3 Product Structure & Dimension

Table 4-1 SCL-61D Ultrasonic Water Meter (Combined/Separated) Dimension

(unit: mm)

Nominal Diameter	Pressure	Outside Diameter	Flange Hole	Sealing Surface	Sealing Surface	Flange Thickness	No. of Flange Hole	Diameter of Flange Hole	Length	Height for Plastic Casing	Height for Metal Casing
	MPa	D	D1	D2	f	b	n	d	L	H	H
DN50	1.6	φ165	φ125	φ102	3	20	4	φ18	200	273	310
	2.5										
DN65	1.6	φ185	φ145	φ122	3	20	4	φ18	200	293	321
	2.5					22					
DN80	1.6	φ200	φ160	φ138	3	20	8	φ18	225	304	341
	2.5					24					
DN100	1.6	φ220	φ180	φ158	3	22	8	φ18	250	320	357
	2.5	φ235	φ190	φ162		26		φ22		324	361
DN125	1.6	φ250	φ210	φ188	3	22	8	φ18	250	346	383
	2.5	φ270	φ220			28		φ26		351	388
DN150	1.6	φ285	φ240	φ212	3	24	8	φ22	300	375	412
	2.5	φ300	φ250	φ218		30		φ26		381	418
DN200	1.6	φ340	φ295	φ268	3	24	8	φ22	350	418	455
	2.5	φ360	φ310	φ278		32		12		φ26	425
DN250	1.6	φ405	φ355	φ320	3		12	φ26	450	483.5	502.5
	2.5	φ425	φ370	φ335		30		φ30		493.5	512.5
DN300	1.6	φ460	φ410	φ378	4	28	12	φ26	500	557.5	565.5
	2.5	φ485	φ430	φ395		34		16		φ30	570

Note: The client can order specific length for L.

4 Operating Instructions

4.1 Front Plate

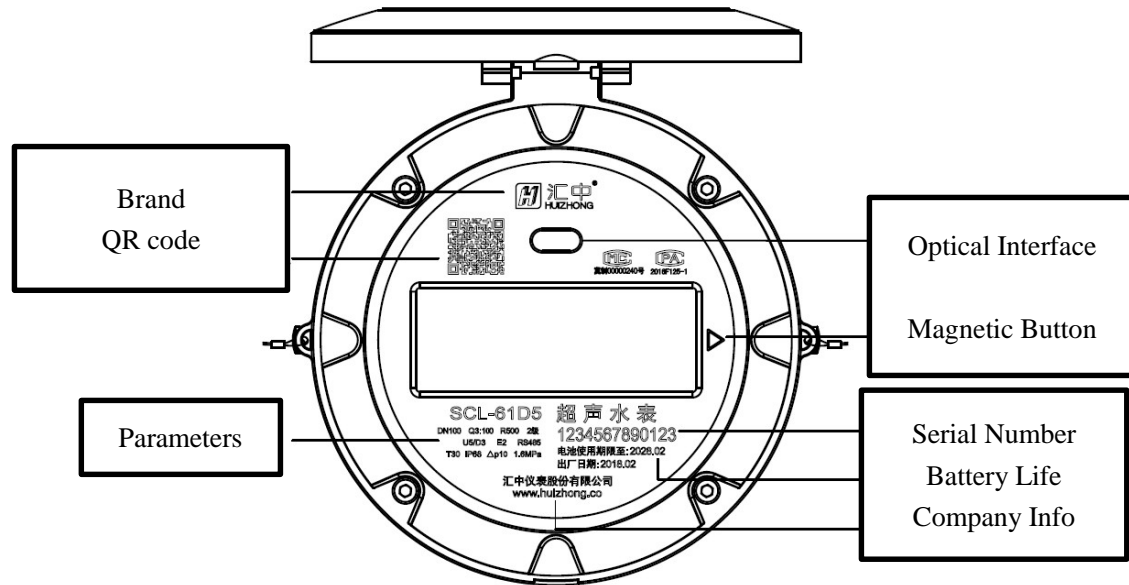


Table 4-1 SCL-61D Ultrasonic Water Meter (Metal casing) Front Plate

4 Operating Instructions

4.2 LCD Display

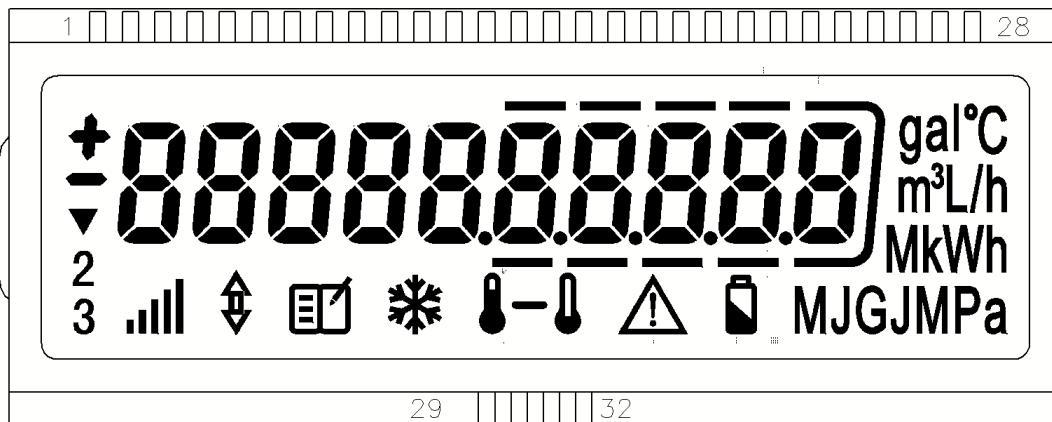


Table 4-2 LCD Display

LCD displays by 10 digits, which will satisfy the demands of resolution and range for different clients. In order to facilitate the user to read, the decimal part adopts the frame explicit prompt; At the same time, the meter LCD can display a variety of information prompt symbols to ensure the stable and reliable operation of the system. The meanings of symbols are as followed:

Table 4-1 The corresponding meanings of LCD symbols

Symbol	Meaning	Symbol	Meaning
	+/- volume (for dual direction only)		Valid operation
	Temperature		Remain
	Unusual flow		Low battery
MPa	Pressure unit	m³L/h	Flowrate unit
°C	Temperature unit		Numeric Display


4 Operating Instructions

Note:

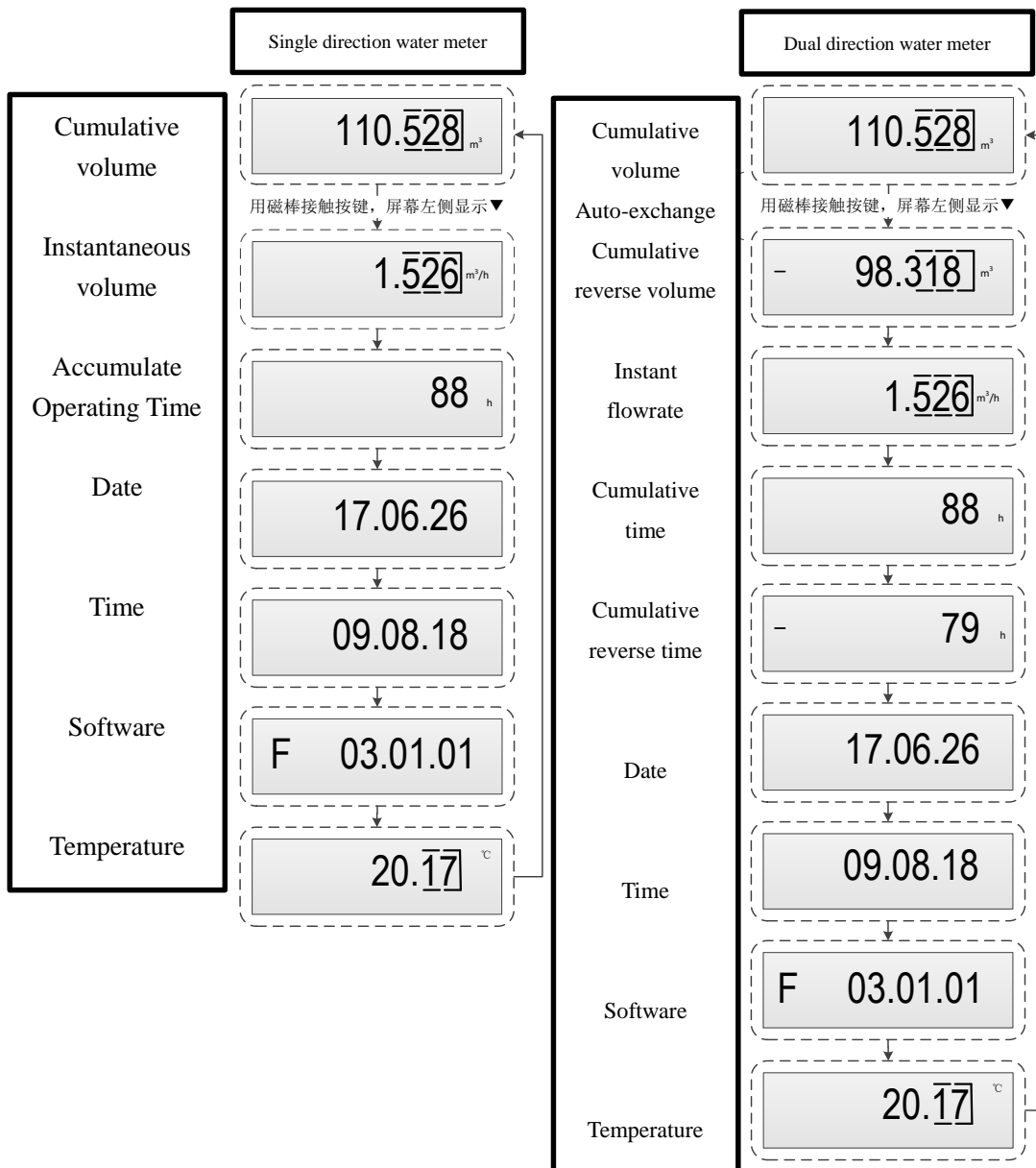
1. It requires Infrared portable device (the device needs separately purchase) to have access to meter with optical interface.
2. The meter applies magnetic induction button operations by vertically place magnetic bar near the button, and "▼" on LCD display indicates the operation is valid.
3. "▲" on LCD display indicates that there is no water in pipe, or large on bubble content; the cumulative effective operating time would not be accumulated.
4. When the cumulative flowrate exceeds 199999999.9m³, the display value would start from 0.

4 Operating Instructions

4.3 Operating Instructions

Ultrasonic water meter main screen displays cumulative flow, unit: m^3 . Client can use attached magnetic bar to approach button  to display measurement data in a loop.

Contents are as followed:



Notice:

The meter will automatically return to “cumulative flow” display if stay at other display for more than 10 minutes.

5 Communications

5.1 Optical Interface

Optical interface is using infrared transmitting tube for Near Field Communication (NFC);

Tools: Infrared Reading cable and infrared reading portable device;

In conformity with EN13757 standards, baud rate 2400bps;

Apart from reading meter parameters, it can also control the meter to enter calibration/debugging status including component verification, total verification and component combination verification.

5.2 M-BUS

M-BUS (Meter bus) is a European Dual-wire Bus standard, it is a data bus standard designed specifically to transmit information for consumption measuring instruments and counters, a communication line for speed remote meter reading, high in reliability.

Support EN13757 protocol, Huizhong protocol and Modbus protocol, default is Huizhong protocol, baud rate is selectable from 2400bps, 4800bps and 9600bps, default is 2400bps.

Transmission distance $\leq 1200\text{m}$;

There are two wires on meter, which should connect to bus accordingly, no polarity considered during connection.

5.3 RS-485

RS-485 is a dual-wire long-distance serial communication using RS-485 communication hardware.

Communication protocol and baud rate are same as M-Bus;

Transmission distance $\leq 1200\text{m}$;

There are two wires on meter, which should connect to bus, accordingly, need to differentiate polarity during connection, it could be damaged if wrongly

5 Communication

connected.

Using with specific upper computer software.

5.4 Analogue Output

SCL-61D Ultrasonic water meter can adopt dual-wire (4~20mA) analogue output, external connected DC24V power supply;

Dual-wire indicates working power supply shares the same wire of signal;

The measured current amount reflects the Instant flow rate, the calculation is as followed:

Analogue output current = $4\text{mA} + 16 \times (\text{current Instant flowrate} \div \text{estimated maximum measuring range})$;

For example, the estimated maximum measuring range is 100m³/h, when current Instant flowrate is 60m³/h, analogue output current = $4 + 16 \times (60 \div 100)$ = 13.6 mA (keep one decimal);

When Instant flowrate \geq estimated maximum analogue output, current output reaches full-scale value;

Maximum range is set before delivery, customer should be specific when placing orders.

5.5 Cumulative Switching Volume

DC power supply is from external, requires $DC \leq 30V$, $I \leq 20\text{mA}$;

The meter will set range as customized cumulative pulse, when the cumulative flowrate algebraic sum within measuring period reaches cumulative pulse equivalent, there will output a pulse;

Cumulative pulse equivalent indicates that the cumulative flowrate algebraic sum within the measuring period (1 second) will output 1 pulse (=positive cumulative flow rate + negative cumulative flow rate);

Pulse output width 5ms, period 10ms, requires external secondary meter response speed $\geq 150\text{Hz}$;

For example, customized cumulative pulse equivalent is 10.0m³, there will be one pulse output when meter cumulative flowrate algebraic sum within measuring period reaches 10.0m³.

5 Communication

When customer select cumulative pulse equivalent, should be in line with the formula (1) to calculate increased flowrate per second Q_s :

$$Q_s = \frac{Q_p}{3600} \quad (1)$$

In which, Q_p is permanent flowrate of measured liquid in pipe (unit: m³);

The amount of cumulative pulse outputted within measuring period (1 second) is calculated by formula (2):

$$N = \frac{Q_s}{Q_d}$$

In which, Q_d is the customized cumulative pulse equivalent.

Suggested that customized $N=1$, then

$$Q_d = Q_s$$

for example, normally increased flowrate per second is 0.9m³, then customized cumulative pulse equivalent is 1.0m³.

6 Data Storage

6 Data Storage

Data storage adopt double-backup method, including internal storage (FLASH) and external storage (EEPROM).

The customer can query historical data via external storage, when external storage is different from internal storage, the internal storage information shall prevail.

Internal storage is an independent permanent storage, which ensures the long-term reliable storage of meter data, it can still store 100 years even without power supply. Please see details in below:

Table 7-1 Storage content

Storage Content	Description
Daily Historical Data	Store at 23:59 every day for latest 184 days' data
Monthly Historical Data	Store at 00:00:00 of last day in every month for latest 24 months' data

Table 7-2 Detailed storage content

Storage Content	Daily Historical Data	Monthly Historical Data
Date	•	•
Cumulative Operating Time	•	•
Cumulative Flowrate	•	•
Diagnostic Information Code	•	—
Maximum Flowrate	—	•

Note: please be specific when ordering if more storage information required.

7 Installations and Connection

7.1 General Requirements

The calibration, maintenance, replacement parts and maintenance should be carried out by qualified technicians. If more technical support is needed, please contact manufacturer.

The meter should be installed strictly according to professional design position, it is forbidden to move privately.

In order to ensure the accuracy of the meter, any change of cable length is not recommended.

Guarantee/Warranty will be automatically free if the seal of the water meter be improperly removed without authorization.

Before installation, it is necessary to ensure that the circulating pipeline is properly flushed.

It is recommended that the valve should be installed on the front and back pipe of the water meter to facilitate maintenance.

The replacement of battery should be done only by professionals.

7.2 Installation Position Description

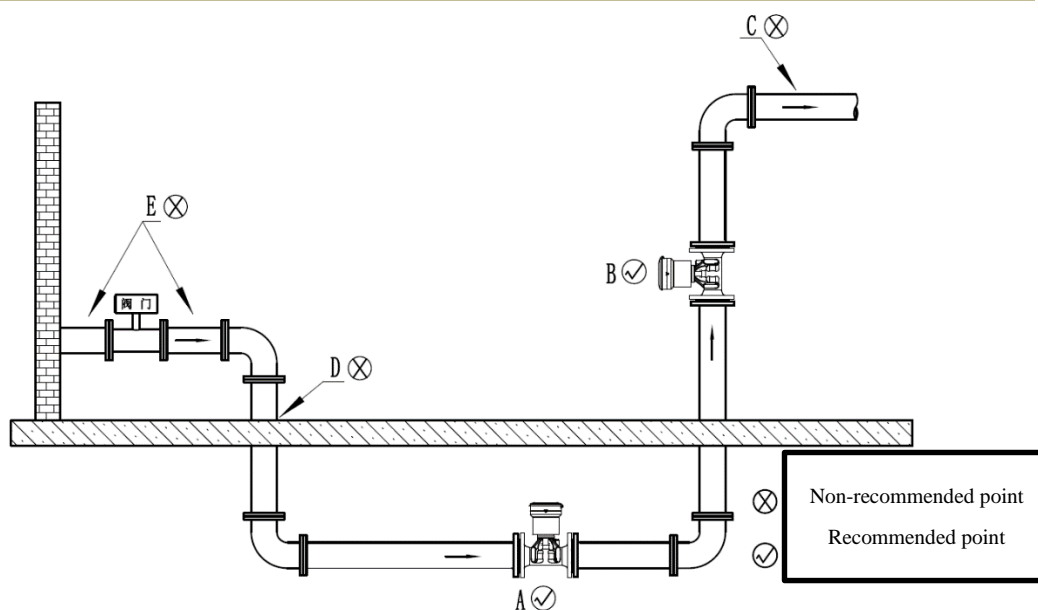


Fig. 5-1 Installation location schematic

Point A is recommended installation location, the meter is installed at the lower part of the pipe, and the back end of the meter has back pressure, which will not produce bubbles to affect the measurement accuracy;

Point B is recommended installation location, the meter is installed at the vertical (or obliquely upward) upflowed pipe, which will also not produce bubbles to affect the measurement accuracy;

Point C is not recommended installation location, the meter is installed at the peak of pipe, which will possibly produce bubbles to affect the measurement accuracy;

Point D is not recommended installation location, the meter is installed at the vertical downflow pipe, and the back end of the meter has no back pressure, which might occur the phenomenon of non-full pipe and affect the measurement accuracy;

Point E is not recommended installation location, it is complex flow regime before and after the valve, which will affect measurement accuracy. Be sure to have enough length of straight pipe before and after the meter.

7 Installation and Connection

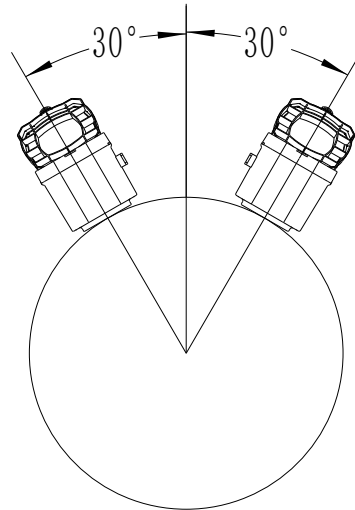


Fig. 5-2 Meter Installation Angle Diagram.

- 1) As shown in picture above, when the meter installs on the pipe, the best method is to keep the panel of meter in a horizontal way; the maximum angle of inclination is 30° . The purpose is not placing transducers on the top of pipe, avoiding the phenomenon of air bubbles inside the pipe for accuracy issue.

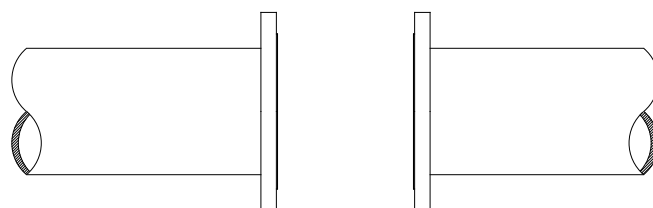
7.3 Meter Installation Instruction

Cut open the water supply pipe at the position of installation and save the space for meter.



Figure 5-3 Flange Connection 1

Weld the pipe flange to the pipe.



7 Installation and Connection

Figure 5-4 Flange Connection 2

Add sealing between meter flange and pipe flange, keep the center aligned, and flanges bolted together.

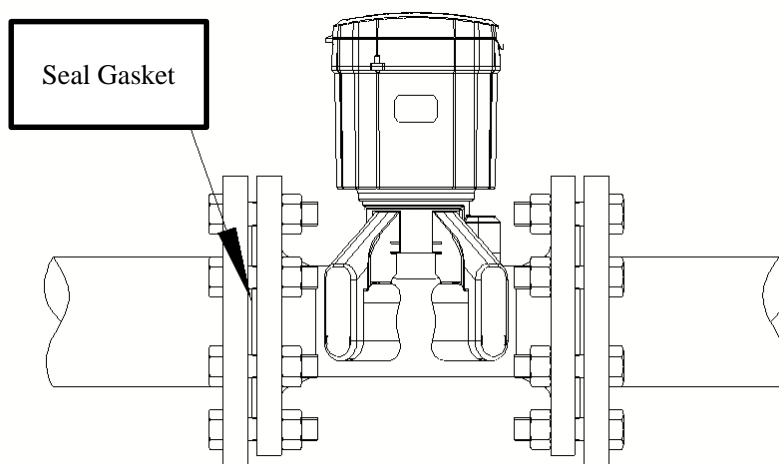



Fig. 5-5 Flange Connection 3

Caution:

Pay attention to sealings for leakage;

The "  " signal of meter should be the same as actual direction.

Keep the meter safe when cutting and welding in case of splashed welding points.

Do not let sealing gland into the pipe to affect meter accuracy.

When opening the pipe valve after the installation of the instrument, special attention should be paid to avoid forming negative pressure in the pipe at the installation of the instrument so as not to damage the instrument.

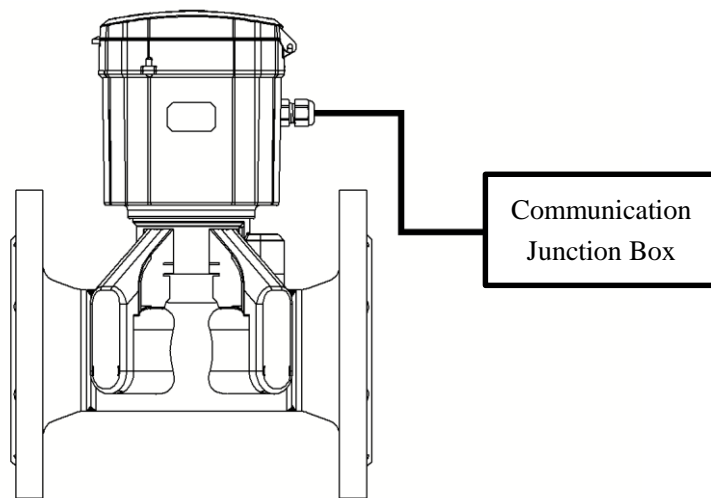
7.4 Electrical Connection Instructions

7.4.1 Electrical connection method for internal power supply meter

When product is in-built battery power supply, there is a junction box for

7 Installation and Connection

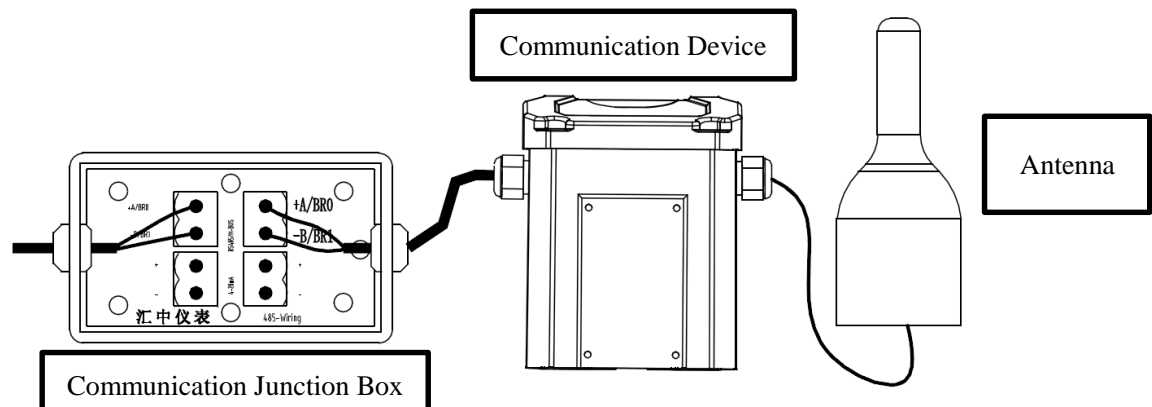
communication, shown as Picture 5-6:



Picture 7-6 Sketch of in-built battery power supply meter junction box

RS-485 Communication wire connection

Open RS-485 communication junction box and penetrate the RS-485 communication wire into junction box hole, electrode A and B connect to label +A/BR0 and -B/BR1 accordingly, as shown in Fig 7-7. Make sure the connection is firm. In order to avoid the foreign matter such as water, dust, after the completeness of wire connection, the box is potted with sealant, then close the upper case, and complete the connection.



Picture 7-7 Sketch of RS-485/M-bus communication junction box

M-bus Communication wire connection

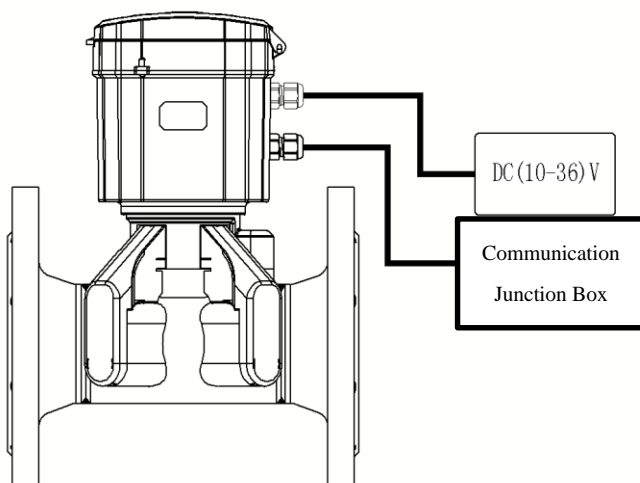
Open M-bus communication junction box and penetrate the M-bus communication wire into junction box hole, electrode A and B connect to label +A/BR0 and -B/BR1 accordingly, as shown in Fig 7-7. Make sure the connection is firm. In order to avoid the foreign matter such as water, dust, after the completeness of wire connection, the box is potted with sealant, then close the

7 Installation and Connection

upper case, and complete the connection.

7.4.2 Electrical connection method for external power supply meter

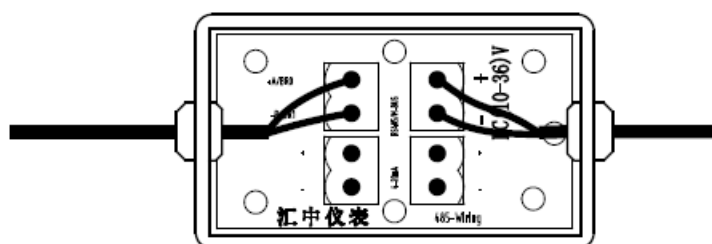
When the user selects the product to use external power supply, the meter has two junction boxes, respectively the power junction box and the communication junction box, as shown in Picture 7-8:



Picture 7-8 Sketch of external power supply junction box

DC (10~36) V power supply wire connection

Open DC (10~36) V power junction box and penetrate the DC power wire into junction box hole, electrode A and B connect to label + DC (10~36) V and - DC (10~36) V accordingly, as shown in Picture 7-9. Make sure the connection is firm. In order to avoid the foreign matter such as water, dust, after the completeness of wire connection, the box is potted with sealant, then close the upper case, and complete the connection.



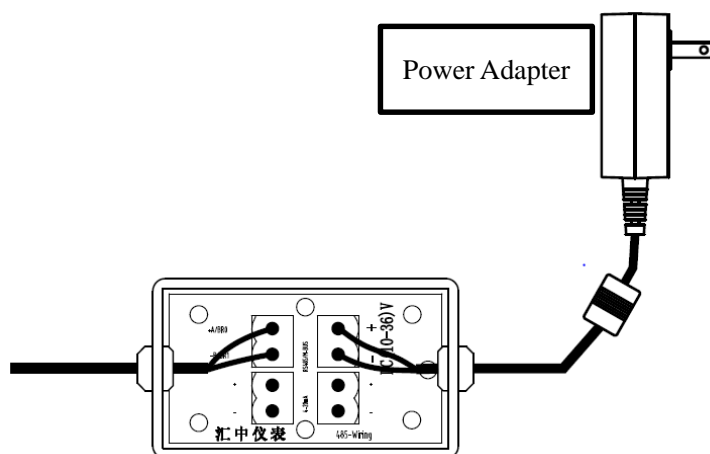
Picture 7-9 Sketch of power supply junction box wire connection

AC220V \pm 10%, 50Hz power supply wire connection *

If client does not have stable DC power supply, power adapter is required when ordering. Connect the AC outlet of adapter to AC220V power provided by client,

7 Installation and Connection

and DC power outlet connects to DC (10~36) V power junction box, electrode A and B connect to label + DC (10~36) V and - DC (10~36) V accordingly, as shown in Picture 7-10. Make sure the connection is firm. In order to avoid the foreign matter such as water, dust, after the completeness of wire connection, the box is potted with sealant, then close the upper case, and complete the connection.




Picture 7-10 Wiring diagram of power junction box

* External AC power supply is non-standard external power supply configuration. It needs to be specific when ordering

External communication connection method is same as 7.4.1

8 Battery

The product applies Lithium 3.6V battery, the service life is over 10 years under environmental temperature 0°C ~ 35°C; when the meter displays “” symbol, it indicates that the battery is running out, needs replacement, otherwise will cause lack of measurement data. While replacing the battery, the operation requires factory trained professionals, or send the device back to factory for replacement. After replaced the battery, the “cumulative flowrate” and “cumulative effective running time” will not lose.

9 Calibration Method

Calibration standard

Calibration is made in conformity to China national standard JJG162-2009 <Cold water meter>.

According to calibration regulation, the flow standard equipment is required to fulfill following items:

The equipment should have effective verified certification.

The accuracy rating of the equipment not exceeding the water meter basic error' s 1/5.

The test flow range, test drift diameter range and the test section installation condition of the equipment should meet the requirement of the water that being tested.

Water should be in full pipe with stable unidirectional flow, the suspended solid content shall be no more than 10g/L, and the grain size no more than 1 mm, no mixed gas, air bubbles.

Installation requirement of the ultrasonic water meter:

Align the meter and pipeline, and the sealing gasket should not protrude into the pipeline.

The direction of the installation is as same as the direction of the flow.

Verification operation:

After the installation, start verification system, first is to exhaust the air; after the system is stable, use the dedicated meter and make it into a cumulative flowrate

9 Calibration Method

state (current measurement cycle is 4 times per second); adjust the flowrate to a certain verified flow point, use the magnetic bar to click magnetic induction key at the right of LCD screen, first click indicates "start" , second click indicates "stop" , and third click "clear" , cycling in order.

Single point error calculation:

The error at the i point

$$Ei = \frac{q_i - q_{si}}{q_{si}} \times 100\%$$

q_i - Cumulative flowrate of meter display

q_{si} - Standard flowrate

Coefficient modification:

According to various flowrate point, when meet the requirement of the modification, the meter can be modified for its coefficient by professional tools.

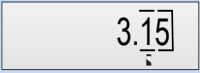
10 Fault Remedy and After-sales Service

10 Fault Remedy and After-sales Service

10.1 Common Fault Remedy

Please check with this fault remedy manual if the product fails. If the manual is not enough, please contact the factory to repair.

Table 8-1 Common Fault Remedy

Fault Phenomenon	Cause	Solution
Display "⚠" in long-term	<ol style="list-style-type: none"> 1. Empty pipe; 2. The surface of the transducer is seriously fouled; 3. Meter failure. 	<ol style="list-style-type: none"> 1. Fill the pipe with water; 2. Remove scaling on the transducer surface; 3. Please contact the manufacturer to repair
Display "⚠" frequently	Excessive air bubbles or impurities in fluid.	Remove bubbles or impurities from the fluid
Display "🔋"	Low battery	Battery should be replaced
Display 	Indicates that battery is seriously low, the number on LCD indicates current battery voltage, meter will not perform measurement, but reading is valid	Must replace battery
Display "🌡" in long-term	Represents the failure of temperature sensor	Please contact the manufacturer to repair
Display "88888888"	Internal memory "EEPROM" fails	Please contact the manufacturer to repair

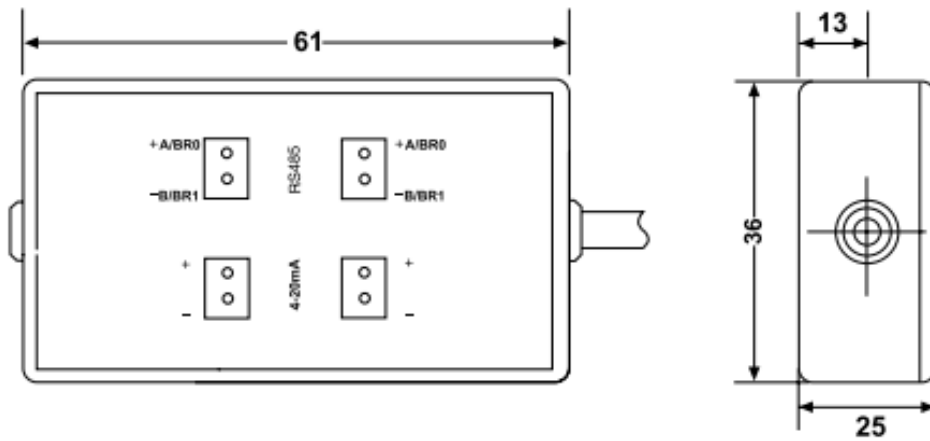
10 Fault Remedy and After-sales Service

Sub-display "44444444"	Wrong connection between sub-display to main measurement device; RS-485 connection wrongly.	Please connect the lead wire correctly
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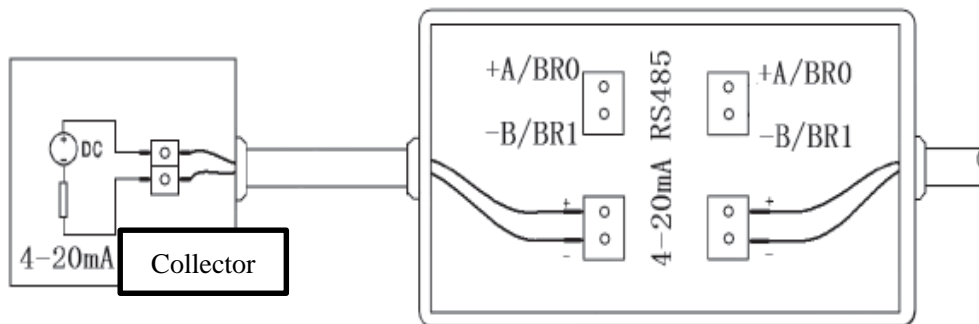
Appendix A

Junction Box Dimension Instruction

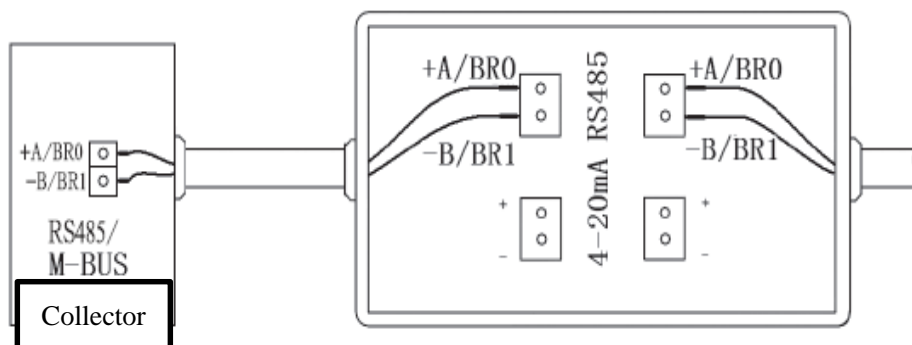
Dimension of junction box (provided according to user' s model selection)
(unit: mm)



Picture A-1 Sketch of junction box



Picture A-2 Sketch of meter junction and (4~20) mA collector connection



Picture A-3 Sketch of meter junction and RS485/M-Bus collector connection

Appendix B

Ultrasonic water meter catalog

Appendix C

C.1: Single channel flow meter's upper and lower minimum length of straight pipe section

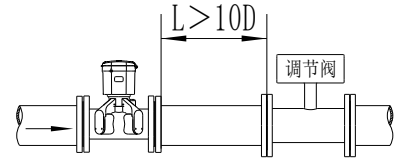
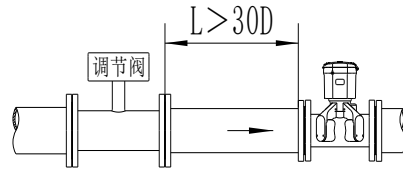
CJ/T 3036-1997 《Ultrasonic flowmeter for water supply and drainage (velocity propagation method)》 has limited the upper and lower minimum length of straight pipe for single channel flow meter, provided here as reference.

Table C-1 Minimum straight pipe length (D is Pipe inner diameter)

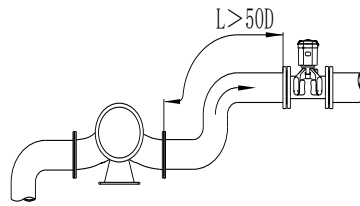
Resistance Part	Upper	Lower
90 ° Bent pipe		
"T" Pipe		
Wider Pipe		
Reducing Pipe		

Appendix C

Valve



Pump



Address: No.126 West Gaoxin Road, High-Tech Industrial Development Zone,
Tangshan 063020, China

Sales: 0315-3296878, 3296898

After-sales: 0315-3208508

Fax: 0315-3208503, 3190081

Postal Code: 063020

E-mail: info@hzyb.com

<http://www.huizhong.co>

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