



HUIZHONG

SCL – 61H Ultrasonic Water Meter

Installation and User Guide



Huizhong Instrumentation Co., Ltd.

Dear Users and Friends:

Thank you for your choice of our company's ultrasonic flow measuring meters. Huizhong Instrumentation Co., Ltd. is currently China's R&D and manufacture base of series ultrasonic heat meters, water meters and flowmeters and related systems. It is also a new and high-tech and software enterprise of Hebei province.

Huizhong owns the independent intellectual property rights of all the products, and it has always been the leading edge of ultrasonic measuring field, it has been involved in establishing the industry standards such as "Heat meter" of National Ministry of Construction, "Ultrasonic Flowmeter for Water Supply and Drainage Application (operating on the principle of propagation velocity difference)", and "Regulations on Calibration of Ultrasonic Flowmeters", etc.

In 2008, the company participated in the research of "Flow Sensor and System for Industrial Process Control System"—the 863 Program assigned by the Ministry of Science and Technology. The research-derived achievements are constructive to the independent R & D and industrialization of advanced sensors in China.

Incessant technical innovation lays a solid foundation which enables the company's products to maintain all along technologically a leading position and win the acclaim of numerous users both at home and abroad for their leading technology and superior quality. Among them, the series ultrasonic flowmeters and water meters have been sold in batch quantities to Europe, African, North American and South Asian countries and regions, the products are well accepted by users.

Huizhong Instrumentation Co., Ltd continuously innovate the ultrasonic flow measuring technology and energy management and control systems service capabilities to satisfy the needs of users with world-class products and services and make contributions to the development of global water and energy conservation course.

Quality Assurance:

The standards and approved certifications for the series of products:

- Manufacture certification: Measuring Apparatus Certificate Ji Zhi 00000240 issued by the P.R.C.
- Measuring Equipment Type Approval Certificate 2013F185-13 Authentication certificates granted.
- International Standards Organisation ("ISO") ISO 4064
- NMI R49
- Watermark(AS3565.1,AS4020)

Enterprise certificates:

- Quality Management System GB/T 19001-2016 / ISO9001:2015;
- Environment Management System GB/T 24001-2016 / ISO14001:2015;
- Measurement Management System GB/T 19022-2003 / ISO10012:2003.

Important Notices:

1. Please do read the Installation & User Guide carefully prior to the use of the meter.
2. Please keep this instruction manual for reference whenever necessary.
3. Please operate the meter strictly in accordance with the instructions. Huizhong bears no responsibility for any consequence resulted from user's failure to follow the directives.
4. All the diagrams shown in this instruction manual are illustrated instructions for operation, and do not serve as a basis for meter inspection. If there exists in the instruction manual any data that is inconsistent with that of the meter for use, take the meter actually used as the criterion, or consult with our company.
5. The meter has been subjected to fine calibration before delivery. Huizhong bears no responsibility for any damage resulted from arbitrary disassemble of the meter by user.
6. When the Symbol “⚠” or “🔋” comes to display, please refer to the List of Common Troubles for remedy. Otherwise, meter-measured data may get lost.
7. If the meter does not work properly or it needs repair and maintenance, contact us or our authorized agency.
8. Once the products were sold, prohibit opening the lead sealing, otherwise Huizhong bears no responsibility for any damage resulted from it.



Warning: Please proceed with your meter installation and operation strictly in accordance with the instructions for avoiding the loss of your interests.

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Safety Warning: Please proceed with following precautions and use the meter correctly for avoiding economic loss, personal injury and death!

- 1 The meter is a precision device and must be operated by specialized personnel.
- 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 contracts 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 Any exposed threaded parts of the product may cause skin scratches. Please be careful for operations.
 - 4 Try to avoid using it in an acidic environment or in a salty environment, which will speed up the aging of the product and cause the product to fail to meet hygiene standards.
 - 5 This product is a precision measuring instrument, do not drop it or cause it to be hit.
 - 6 Avoid that direct sunlight to the display panels of meter for long periods of time.

1. Introduction

- SCL-61H ultrasonic water meter is designed to work on "propagation velocity difference" principle. It is a meter working with measurement-integration-display integrated functions and micro-power consumption technology. A flowrate as low as 0.006m³/h can be precisely measured. It enjoys the merits of being compacted in size and high in stability and anti-interference capability.
- Due to its use of ultrasonic measuring technology, the meter can be installed in different angles without being affected in measuring accuracy. Moreover, the pressure loss of pipe flow can be reduced to a minimum.
- It is a meter specifically designed for use in residential area, buildings or sub-district.
- SCL-61H ultrasonic water meter supports Narrow Band IOT network for data upload and download.

2. Technical Parameters

Table2-1 Technical Parameters

Item	Parameter
Accuracy Class	Class 2
Nominal Diameter, mm	DN15~DN40
Dynamic Range	≥250
Max. Permissible Working Pressure	1.6MPa
Ambient Temperature	-10℃ ~+55℃ ≤100%RH (Please specific when exceeding the range)
Temperature Class	T30、T50、Default T30
Class of Upstream Flow Field Sensitivity	U0
Class of Downstream Flow Field Sensitivity	D0
Category of Climate & Mechanical Environment Conditions	Class O
Class of Electromagnetic Compatibility	E1
Pushbutton	Photosensitive Key
Display	LCD 10-digit + prompting characters
Contents of Display	Cumulative flowrate(kL), Instantaneous flowrate(kL/h), Water temperature(℃), Cumulative running time(h), Date(Y/M/D), Time(H/M/S), Software version, Screen test, Water pressure(mbar)
Display Resolution	Cumulative flowrate 0.00001kL or 0.001kL,default 0.001kL . Instantaneous flowrate 0.00001kL/h, Water temperature 0.01℃, water pressure 1 mbar

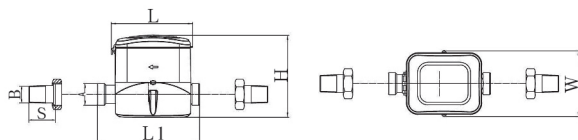
Range of Display		Cumulative flowrate: 0kL~+19999.99999kL or 0kL~+1999999.999kL Default 0kL~+1999999.999kL
Com- munication	Photoelectric Interface	Baud rate: 2400bps,even, Protocol: EN13757(support TOTP)
	Wireless Com- munication	NB-IoT (Data report period once per day)
Data Storage		Current 24 months of monthly accumulated flowrate and corresponding time; latest 100 daily accumulated flowrate; latest 2400 interval water consumption data; latest 300 water temperature data; latest 300 water pressure data; latest 100 daily maximum flow rate. The data can store for 100 years after power outage.
Power Supply		Battery supply DC3.6V (battery can support meter to work for over 10 years)
Power Consumption	Mea- surement	<0.2mW
	Com- munication	Average power consumption is 0.3mW, maximum current≤1A
Protection Class		IP68
Storage Temperature		-25℃ +55℃ ≤100%RH
Meter Mounting Position		Water supply pipe
Pressure Sensor (optional)	Range	0~1.6MPa
	Reference Accuracy (0℃ ~+40℃)	±0.5 % FS

Note 1: Low signal strength, repeating of data sending and high frequency of alarming will reduce battery life

Table 2-2 Range of Flowrate Parameters

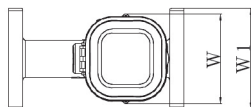
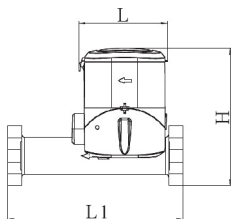
Nominal Diameter (mm)	DN15		DN20			DN25		DN32	DN40	
Permanent Flowrate Q_3 (kL/h)	1.6	2.5	1.6	2.5	4.0	4.0	6.3	10.0	10.0	16.0
Overload Flowrate Q_4 (kL/h)	2.0	3.125	2.0	3.125	5.0	5.0	7.87	12.5	12.5	20
Transitional Flowrate Q_2 (kL/h)	0.010	0.016	0.010	0.016	0.025	0.025	0.040	0.064	0.064	0.100
Min. Flowrate Q_1 (kL/h)	0.006	0.010	0.006	0.010	0.016	0.016	0.025	0.040	0.040	0.064
Starting Flowrate (kL/h)	0.0015	0.0015	0.0026	0.0026	0.0026	0.004	0.004	0.006	0.0085	0.0085
Pressure Loss	Δp 25	Δp 63	Δp 10	Δp 25	Δp 63	Δp 25	Δp 63	Δp 40	Δp 25	Δp 40

3. Product Dimensions



Nominal Diameter (mm)	DN15	DN20	DN25
A Meter mounted without connecting fittings	$G \frac{3}{4} B$	32.512mm (1.280 in). Major diameter, 14TPI (Whitworth Form)	38.862 mm (1.530 in). Major diameter, 14TPI (Whitworth)

B Meter mounted with connecting fittings	R $\frac{1}{2}$	20 mm ($\frac{3}{4}$ in.) BSP, 14TPI (Whitworth Form)	25 mm (1 in.) BSP, 14TPI (Whitworth Form)
L(mm)	97		
L1(mm)	134	154	178
H(mm)	119		
W(mm)	98		
Length of connecting fittings S(mm)	45	51	59



Nominal Diameter (mm)	DN32	DN40
L(mm)	97	
L1(mm)	190	232
H(mm)	150	155
W(mm)	98	
W1(mm)	110	124

4. Operating Instruction

- Front Panel (The actually panel information is subject to the factory delivery)



Figure 4-1 Front Panel

- Operating Instruction
Main screen display is as follows:



The photosensitive key can be used to switch to the various displays as desired for the view of the various measured data which appear cyclically as follows:

512.342
kL

Cumulative Flowrate
(kL)

0.00342
kL/h

Instantaneous Flowrate
(kL/h)

22.42
°C

Water Temperature
(°C)

2
h

Cumulative Effective
Running Time(h)

100
mbar

Pipe Pressure
(mbar)

05-12-2016

Date(DD-MM-YYYY)

11.36.12

Time(HH-MM-SS)

CRC 50786

Firmware CRC

VER 1.0

Software Ver, /Meter
Display alternatively

d 80000001

Full display/All out
alternatively display

Full display/All out
alternatively display

3.66
V













Battery Voltage (V)

1. The default lock is displayed as cumulative flow. If the optical button is covered for more than 3 seconds, it will be unlocked and can be switched between screens each time the optical button is covered.
2. Each time the optical button is covered for a long time, the display can switch between Accumulated Flow, Instantaneous Flow, Water Temperature, and Accumulated Flow.
3. The display will automatically disappear if no button being covered in 2 min.
4. Default back to Accumulated kL after 15 seconds of inactivity

- Display Content Description:

The resolution of LCD applies 10 digits, able to satisfy different users' requirements regarding resolution and dynamic range, in which the flowrate display resolution is as accurate as 0.00001 kL or 0.001 kL. For easy reading, the decimal parts use box display. The meter range could be 19999.99999 kL or 1999999.999 kL at maximum, which ensures the data could be cumulated for a long term under a large flowrate, and avoid the loss of data. In the meantime, LCD can display various symbols as information hints, to ensure the operation of system stable and reliable. The symbols' meanings are as follows:

Table 4-1 Symbol Meanings

Symbol	Meaning	Symbol	Meaning
	+/- or used in combination		Valid operation of button
	Module online or PSM indicator		Module sending & receiving
	Reserve		Reserve
	Continuous Low Flow Alarm (Leakage Indicators)		Continuous High Flow Alarm
	High Temperature Alarm		Low Temperature Alarm
	Unusual Flow Measurement		Low Battery
m ³ L/h	Flowrate unit, able to be used in combination	℃	Temperature Unit (Celsius)
mbar	Pressure unit	^	Successful Registration

● Report Display:

	Main Step	Sub Step	Serial No. /Overtime		RSSI		(Empty)	SNR		
	1 st Bit	2 nd Bit	3 rd Bit	4 th Bit	5 th Bit	6 th Bit	7 th Bit	8 th Bit	9 th Bit	10 th Bit
Prepare Data/Parameters	0	1-3	x	x	-	-		-	-	-
Module reset/power on	1	0	x	x	-	-		-	-	-
NB module initialization	2	1-3	x	x	-	-		-	-	-
Connect to Network	3	1	x	x	-	-		-	-	-
DNS	4	0	x	x	6	5		1	4	4
Send Registration/Update	5	1-3	x	x	6	5		1	4	4
Data Report	6	1-3	x	x	6	5		1	4	4
Wait for PSM	7	0	x	x	6	5		1	4	4
Remote Update	8	x	x	x	6	5		1	4	4
Note: In this screen, "+" indicates success, while "-" indicates failure										

5. Installation and Connection

5.1 Requirements

- The meter must be mounted at the design-specified position. It is strictly forbidden to mount it at other positions.
- Replacement of battery must be done by professional personnel.

5.2 Meter Mounting Location

- (1) A vertical pipe with upward (or oblique upward) flow is the most preferable location, followed by a horizontal pipe. Never mount the meter on a pipe with downward or oblique downward flow, for in this case the pipe may not be full of water.
- (2) Installation position shall not be the highest point of the pipe flow direction, in case there are bubbles inside the pipe affecting normal measurement.



Note: For meters with RF module, the installation position should be away from magnetic field, the distance between the meter's antenna and the wall should be at least 50 mm.

5.3 Mounting Method

Note:



- a. Pay attention to sealing work to avoid leakage when installing!
- b. The direction of the sign ➡ must be complied with the flow!

Mounting Method 1: Meter mounted without connecting fittings

- Cut apart the pipe at the point for meter mounting to leave the required mounting space (Fig. 5-1)

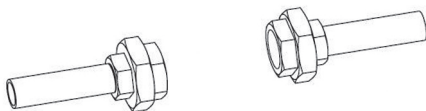


Fig. 5-1 Meter Mounting Diagrammatic Sketch 1

- Align the meter and pipe concentrically. Screw the unions on the meter's connecting threads and then tighten up with a spanner (Fig. 5-2)

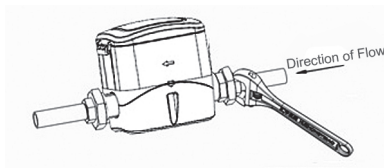


Fig.5-2 Meter Mounting Diagrammatic Sketch 2

Mounting Method 2: Meter mounted with connecting fittings

- Cut apart the pipe at the point for meter mounting to leave the required mounting space for mounting meter and connecting fittings (Fig. 5-3).

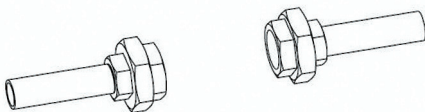


Fig.5-3 Meter Mounting Diagrammatic Sketch 3

- Screw the connecting fittings onto pipe ends (Fig. 5-4).

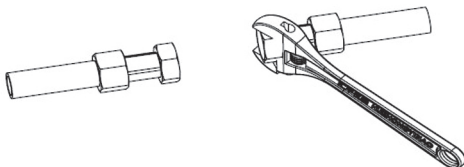


Fig.5-4 Meter Mounting Diagrammatic Sketch 4

- Facing the meter with connecting fitting for installation (Fig. 5-5).

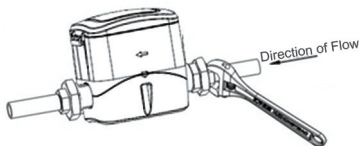



Fig.5-5 Meter Mounting Diagrammatic Sketch 5

6 Battery Replacement

It is a 3.6V lithium battery under an ambient temperature of 0°C ~35°C . When the symbol  is on display, it indicates the battery is low and needs to be replaced for avoiding loss of measured data. Replacement of battery must be made by trained professionals or alternatively, having the meter sent back to Huizhong for battery replacement. After battery is replaced, the Cumulative Flowrate and Cumulative Effective Running Time remain in storage.

7 Calibration







The meter calibration methods follow JJG162-2009 cold water meter verification regulations, verification requires a complete set of special tools, test condition and set the relevant parameters can be found in the special tool operation instruction.

8 Troubleshooting and After-sales Service

8.1 Troubleshooting

In case of malfunction, first refer to this trouble remedy guide. If no ready solution can be found, please contact Huizhong for support.

Table 8-1 Troubleshooting

Faults	Content	Solution
Display  in long term	1. Empty pipe 2. Thick scale deposit on transducer surface 3. Meter malfunction	1. Keep pipe full of liquid 2. Clean the transducer 3. Contact Huizhong
Frequently display 	Excessive air bubbles or impurities in water or medium	Remove the bubbles or impurities
Low Temperature Alarm & High Temperature Alarm display at the same time  	Measuring fault of the temperature sensor / Alarm fault	Contact Huizhong
Long time show "mbar"	Pressure sensor fault	Contact Huizhong
Display 	Low battery	Replace the battery soon
Display on screen 	Battery is too low with the readout on the screen to indicate the current voltage. For now the meter is no longer measuring, but can browse the stored data.	Battery must be replaced
Screen display "88888888" for a long time	EEPROM malfunctions	Contact Huizhong

8.2 After-sales Service Commitment

Huizhong Instrumentation Co., Ltd. operates by adhering to the principle of “being user’s most trustworthy friend and providing users our quality products and timely first-rate after-sale service”. Our specific commitments are as follows:

1. After receiving user’s call, we promise to make a response within 2 hours (Chinese Mainland).
2. We promise to repair any meter within one year after its date of delivery free of charge including the cost of labor and components.
3. “Free repair” is limited only to the repair of the damaged main measuring unit and key functional components like transducers. Repair of damaged cables is outside the promised scope.
4. Repair of any meter beyond its guaranty period will be conducted on site, if required, with the travel expenses and cost of components covered by user.
5. The free repair provisions shall not cover any of the following damages.
 - 1) Damage of meter due to purely artificial reasons, such as mechanical impact.
 - 2) After-sales service rendered for the repair of any meter damage caused not by the failure of the meter itself, but for the shut-down or abnormal operation of system or user’s failure to operate the meter with the instructions.
 - 3) Damage of meter caused by force majeure, such as thunder strike.
 - 4) For the repair work done on site due to the reasons mentioned above, the travel expenses and costs of components shall be covered by user.
6. If the user sends the meter’s core part or the entire meter back to Huizhong for repair, both parties shall respectively bear the transportation expenses and the costs of components for replacing damaged ones shall be borne by user.

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