

UTX Series Clamp-On Ultrasonic Flow Meter

User Manual



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1. Introduction

1.1 Product Overview

The product is a clamp-on ultrasonic flow meter with an integrated design, which is featured by small size, easy installation and operation, etc., and is suitable for the liquid media flow monitoring of a variety of small-diameter pipes.

1.2 Measurement Principle

When the ultrasonic beam propagates through a liquid, the flow of the liquid will cause a small change in the propagation time, which is proportional to the flow velocity of the liquid. At zero flow, the time required for both transducers to transmit and receive acoustic waves is exactly the same (the only technique that can actually measure zero flow). When the liquid flows, the acoustic transmission time in the upstream direction is greater than the acoustic transmission time in the downstream direction.

The relationship conforms to the following expression:

$$V = \frac{MD}{\sin 2\theta} \times \frac{\Delta T}{T_{up} \bullet T_{down}}$$

Where

θ is the angle between the acoustic beam and the liquid flow direction

M is the number of times the acoustic beam propagates in a straight line through the liquid

D is the pipe diameter

T_{up} is the propagation time of the acoustic beam in the forward direction

T_{down} is the propagation time of the acoustic beam in the reverse direction

$\Delta T = T_{up} - T_{down}$

1.3 Features

- ◆ The measuring medium does not need to be electrically conductive;
- ◆ There is no need to break pipes during the installation process, and there is no need to stop work and production. There is no moving part and no pressure loss;
- ◆ No professional training is required for installation personnel, and they can complete the installation according to the installation video or the installation step diagram;
- ◆ Aviation aluminum alloy, stainless steel clamp, suitable for a variety of supply control environments.

1.4 Product Parameters

Items	Specifications
Housing material	Aluminium alloy, plastic
Mounting screw	Stainless steel
Protection grade	IP54
Flow velocity range	0.05-6m/s, > 0.2m/s to meet the accuracy
Calibration medium	Factory calibration medium: Water
Models	UTX-10, UTX-20, UTX-32, UTX-50
Measurement range	UTX-10: outer diameter Φ 13-18mm UTX-20: outer diameter Φ 18-28mm UTX-32: outer diameter Φ 28-44mm UTX-50: outer diameter Φ 44-64mm
Pipe materials	Stainless steel, carbon steel, copper, PVC, PP, PVDF and other dense pipes
Measurement media	Water, alcohol, gasoline, chemical solvents and other liquids with

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	fixed composition (free of solid particles and impurities)
Media temperature	Standard transducer -10°C - 65°C (unfrozen) / Split transducer -20°C - 160°C
Measurement accuracy	Tolerance < 2%
Response time	1s - 5s
Power supply	12-24VDC
Power consumption	2W
Power supply/output interface	M12-Type A-6-core, 1 piece
Output	4-20mA
Communication	RS485 Modbus
Display screen	12864, LCD (black lettering on white background)
Keys	Light-touch mechanical keys, 4 pcs
Operating ambient temperature	-10°C - 60°C (unfrozen)
Storage temperature	-10°C - 60°C

1.5 Application Environments

1.5.1 Applicable Media (Common examples; if not listed, please contact the manufacturer for confirmation)

The product is suitable for the measurement of almost all single and clean liquids:

It is mainly used in the measurement and control of water (tap water, pure water, and ultrapure water). Due to the continuous expansion of application industries, it is also suitable for various acids, alkalis, organic liquids, chemical solvents, alcohols, beverages, etc.

Applicable fluids:

- ◆ Water
- ◆ Oil
- ◆ Chemicals

1.5.2 Pipe Materials

The product is suitable for the measurement of almost all pipes made of acoustic conductive materials, including metal pipes and plastic pipes.

With the options in the menu, one flow meter can measure both metal and plastic pipes.

Compatible pipe materials:

- ◆ Metal pipes: copper, iron, stainless steel
- ◆ Resin pipes: PVC, others

1.5.3 Pipe Diameter Range

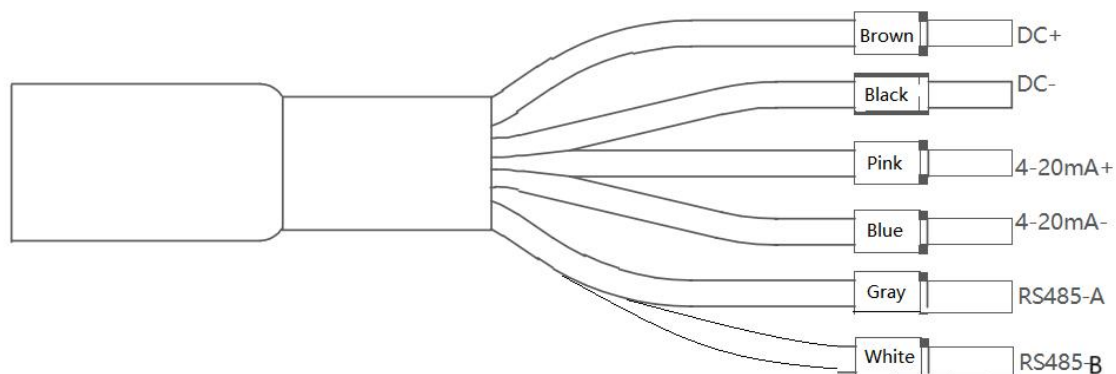
For small-diameter pipes below DN40, the measurement data of other devices is not accurate, and this device is usually used for measurement.

Compatible pipe sizes:

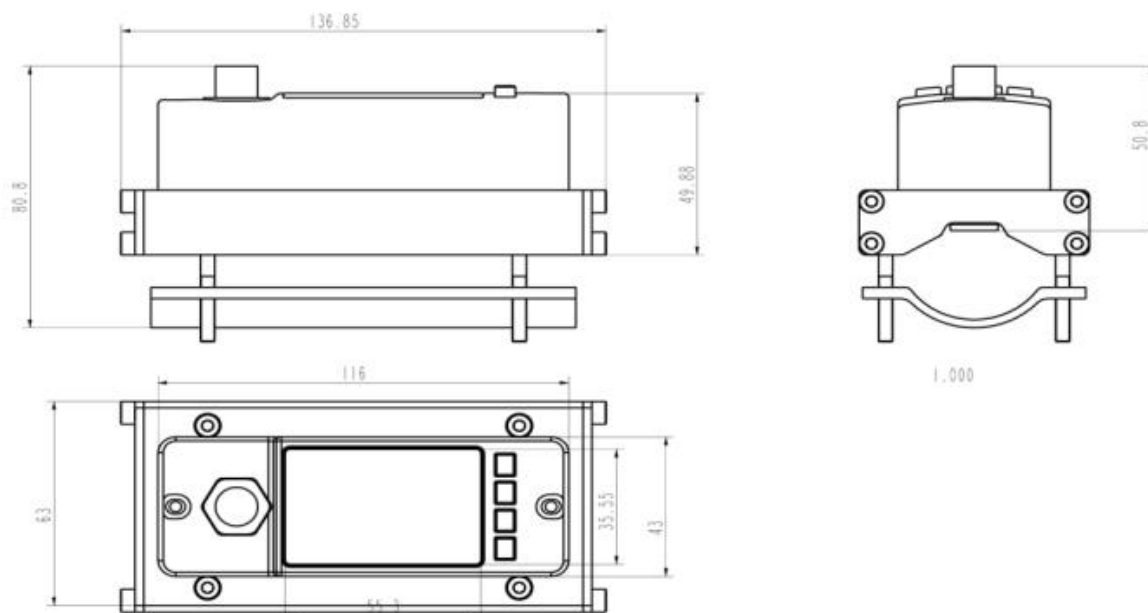
- ◆ DN10-DN63
- ◆ For For DN3~DN10, or above DN65, please contact the manufacturer for confirmation.

1.6 Cable

- ◆ Interface type: M12-Type A-6-core
- ◆ Wiring Diagram



1.7 Transducer Sizes



1.8 Outer Diameters for Different Models

Nominal diameter	Pipe outer diameter (mm)	Flow velocity range	Reference wall thickness range
UTX-10	Outer diameter Φ13-18mm	0.05-6m/s	1.0mm~2.5mm
UTX-20	Outer diameter Φ18-28mm	0.05-6m/s	1.0mm~3.5mm
UTX-32	Outer diameter Φ28-44mm	0.05-6m/s	1.0mm~4.0mm
UTX-50	Outer diameter Φ44-64mm	0.05-6m/s	1.0mm~5.5mm

1.9 Product Output Selection

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	Output
A	Default: RS485, 4-20mA
B	Default: RS485, OCT
C	Default: RS485, solid-state relay
D	Default: 4-20mA, solid-state relay
E	Default: 4-20mA, OCT
F	Default: OCT, solid-state relay

Example: UTX-20A

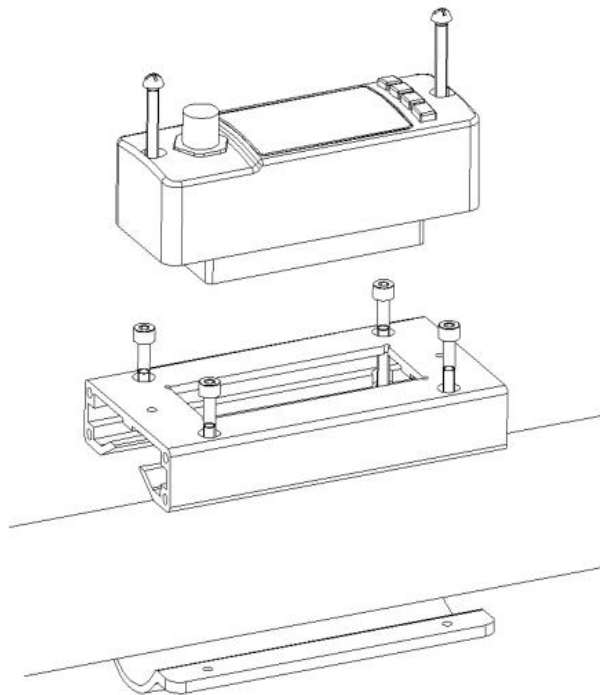
UTX clamp-on ultrasonic flow meter: applicable pipe diameter: DN15-DN25, Outer diameter Φ 18-28mm, transducer temperature range: -10-65°C, 24V AC power supply, with 4-20mA current output and RS485 (Modbus) communication, standard cable length: 2m.

2. Installation and Commissioning

The installation of this meter is simple and convenient. Just select a suitable installation point, enter the pipe parameters at the installation point into the table, and then install the transducer on the pipe.

2.1 Installation

- ◆ Fix the pipe clamp to the pipe and tighten it;
- ◆ Install the transducer to the pipe clamp and fix the screws of the transducer;
- ◆ Note that the installation point shall be kept away from elbows, valves, tees and other positions that may affect the flow state. It shall be installed on a straight pipe, and the position shall be above 10 times the outside diameter of the pipe.



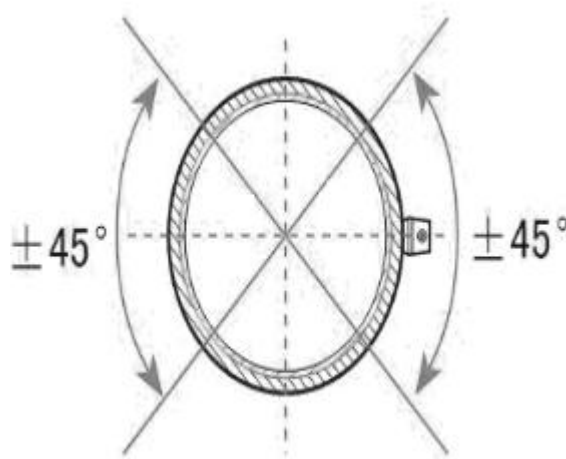
2.2 Selection of the Installation Point

The selection of the installation point is the key to correct measurement, and the following factors shall be considered in the selection of the installation point: full pipe, steady flow, scaling, temperature, and interference.

2.2.1 Full Pipe

To ensure the accuracy and stability of the measurement, the fluid at the measuring point shall fill the pipe section (otherwise the measured value will be too large or not measurable). Therefore, the following conditions shall be met:

The meter shall be installed in the horizontal direction of the axial surface of the pipe, and installed within the range shown in the figure, so as to prevent the upper part from being not filled with the pipe and air bubbles or the lower part from precipitation, which may affect the normal measurement of the transducer.



Full pipe	Possibly not full pipe
1. Select the installation point where the fluid flows vertically upwards 2. Select the installation point where the fluid flows obliquely upwards 3. Select the lowest point in the piping system to install	1. Pipes in which the fluid flows vertically downwards 2. Pipes in which the fluid flows obliquely downwards 3. The highest point of the piping system 4. The fluid is a natural flow 5. Fluid without pressure in the pipe

2.2.2 Steady Flow

A fluid with a steady flow helps to ensure measurement accuracy, while a fluid with a chaotic flow state makes it difficult to ensure measurement accuracy.

Standard requirements to meet steady flow conditions:

- ◆ The pipe section is away from the pump outlet or half-open valve, 10D for upstream and 5D for downstream (D: outer pipe diameter);
- ◆ 30D away from the pump outlet or half-open valve.

If the standard requirements of the steady flow conditions can not be met, the measurement can be tried in the following conditions:

- ◆ There is an elbow or buffer device between the pump outlet or half-open valve and the installation point;
- ◆ Upstream of the pump inlet or valve;
- ◆ The flow velocity of the fluid is medium or low.

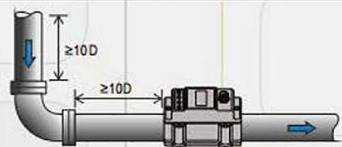
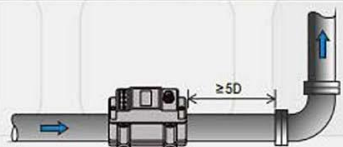
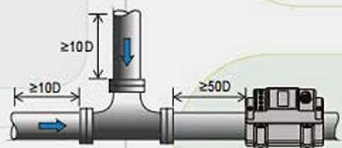
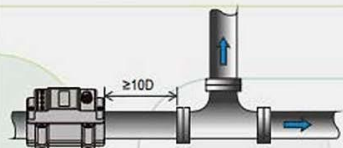
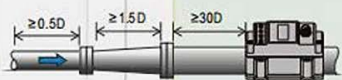
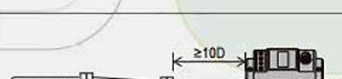
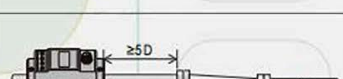
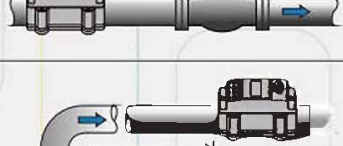
(Low flow velocity: <1m/s; medium flow velocity: 1-2m/s; high flow velocity: >2m/s)

It is difficult to ensure a steady flow in the following cases, so please take care when installing.

- ◆ The straight pipe section from the pump outlet or half-open valve is less than 10D, and there is no buffer device such as an elbow;
- ◆ The straight pipe section from the pump outlet or half-open valve is less than 10D, and the flow velocity is high;
- ◆ Vertical downward flow, oblique downward flow;
- ◆ Downstream: less than 10D away from the open outlet of the pipe.

Note: If it is difficult to determine the steady flow, you can use a portable ultrasonic flow meter to perform an actual measurement and observe the signal.

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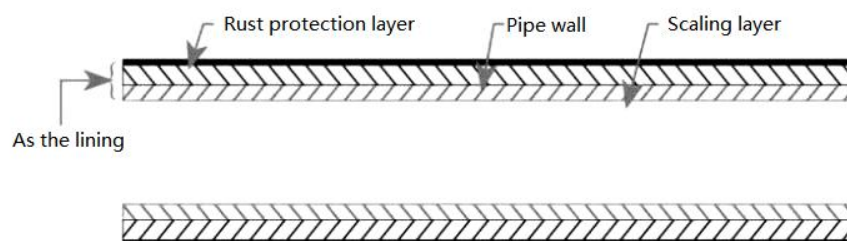
Installation Point	Straight Pipe Section Before Installation Point	Straight Pipe Section After Installation Point
Elbow		
Tee		
Expanding Pipe		
Reducing Pipe		
Valve		
Pump		

Note: D is the outer diameter of the pipe.

2.2.3 Scaling

Scaling of the inner wall of the pipe will lead to attenuation of ultrasonic signal transmission and reduce the inner diameter of the pipe. Therefore, the scaling on the inner wall of the pipe will make the flow meter unable to measure normally or affect the measurement accuracy. Therefore, it is necessary to avoid selecting a position where the inner wall of the pipe is scaled as the installation point. If it is not possible to avoid the scaled installation point, the following measures can be taken to eliminate or reduce the effect of the scaling on the inner wall of the pipe on the measurement.

- ◆ Replace a pipe section at the measuring point.
- ◆ Hit the pipe of the measurement point with a hammer until the signal of the measurement point is enhanced significantly.
- ◆ Set the scaling as the lining to achieve higher measurement accuracy.



2.2.4 Temperature

Exceeding the transducer's operating temperature range may easily cause damage to the transducer or significantly shorten the service life of the transducer. Therefore, the fluid temperature at the installation point shall be within the operating temperature range of the transducer. Try to select an installation point with a lower temperature. Therefore, try to avoid installing it at the boiler water outlet and heat exchanger outlet of the same pipeline, and install it on the return pipe as much as possible (if possible, it is best to measure the temperature of the installation point with an infrared thermometer).

2.2.5 Interference

The main unit, transducer and cable of the ultrasonic flow meter are easily interfered by interference sources such as frequency converters, radio stations, television stations, microwave communication stations, mobile phone base stations, and high-voltage lines. Therefore, when selecting the installation points of the transducer and the main unit, try to stay away from these interference sources. The shielded layer of the main unit housing, transducer, and ultrasonic cable shall be grounded (for plug-in sensors, the grounding wire has been made into a binding post). Do not use the same power supply as the inverter, and use an isolated power supply to supply power to the main unit.

2.3 Enter Measurement Parameters

The initial setup is required before the measurement. Parameters in Menu 11 to Menu 25 need to be entered according to the on-site pipe conditions, and then the measurement can be started.

3. Menu List

3.1 Keypad

M (Used to access menus; type this key first, then type two digit keys, and you will enter the menu window corresponding to the digits)
▲ (Up key; move the menu up or select 0~9, +, or -)
▼ (Down key; move the menu down or move the cursor to the next digit)
↵ (Enter key; used to end menu input or enter a sub-menu)

Example: If you want to access Menu 11

Type **M**, press **▲** once, select "1" for the first digit of the menu, type **▶** again, move the cursor to the second digit of the menu, type **▲** once, select "1" for the second digit of the menu, and then type **↵**.

3.2 Details of Menu Windows

M00 Instantaneous flow, Water flow direction
Instantaneous flow velocity
Signal intensity, Signal quality, Operating state

+0.000_{m3/h}→ Flow velocity +0.0000m/s S=000,000 Q=01+E
Signal intensity

M01 Positive cumulative flow

Positive cumulative flow +0.0000m3 Flow +0.0000m3/h Flow velocity +0.0000m/s S=000,000 Q=01+E
--

M02 Negative cumulative flow

Negative cumulative flow+0.0000m3 Flow +0.0000m3/h Flow velocity +0.0000m/s S=000,000 Q=01+E

M03 Net cumulative flow

Net cumulative flow +0.0000m3 Flow +0.0000m3/h Flow velocity +0.0000m/s S=000,000 Q=01+E

M04 Current time, Instantaneous flow

Date 25-01-01
Time 01:01:01
Flow +0.0000m3/h
S=000,000 Q=01+E

M05 Current time, Instantaneous flow velocity

Date 25-01-01
Time 01:01:01
Flow velocity +0.0000m/h
S=000,000 Q=01+E

M06 Model and size selection
Preset at factory

M06
Model
UTX-10

M07 Manually locate the signal to remove interference

M07
ADC starting point offset
0000

M10 Enter the outer perimeter of the pipe; If the known condition is the outer diameter, enter it in Menu 11.

M10
Enter the outer perimeter of the pipe
00000.0mm

M11 Enter the outer diameter of the pipe directly, or you can enter the outer perimeter in the M10 window. The outer diameter range of the pipe shall be greater than 10mm and less than 6000mm.

M11
Enter the outer diameter of the pipe
00.0mm

M12 Enter the wall thickness of the pipe If the inner diameter of the pipe is known, you can skip this window and go to M13 to enter the inner diameter of the pipe

M12
Enter the wall thickness of the pipe
00.0mm

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M13 Enter the inner diameter of the pipe; If the wall thickness has been entered, no parameters need to be entered in this menu.

M13
Enter the inner diameter of the pipe
00.0mm

M14 Material: carbon steel, stainless steel, cast iron, ductile iron, copper, PVC plastic, aluminum, asbestos, fiberglass, others

M14
Select the pipe material
Carbon steel

M15 Acoustic velocity of the pipe material

M15
Enter the acoustic velocity of the pipe material
3185.0m/s

M16 Lining material: epoxy asphalt, rubber, mortar, polypropylene, polystyrene, polyester, polyethylene, bakelite, PTFE, others

M16
Select the lining material
No lining

M17 Acoustic velocity of the lining material

M17
Enter the acoustic velocity of the lining material
3185.0m/s

M18 Lining thickness

M18
Enter the lining thickness
000.0m

M19 Automatic, Low voltage, High voltage
The transmit power is automatic by default.

M19
Transmitting voltage setting
0-Automatic

M20 The fluid type in the pipe: water, seawater, kerosene, gasoline, fuel oil, crude oil, propane (-45°C), butane (0°C), others, diesel, castor oil, peanut oil, #90 gasoline, #93 gasoline,

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	alcohol, high-temperature water (125℃)
	M20 Select the fluid type Water
M21	Acoustic velocity of the fluid
	M21 Enter the acoustic velocity of the fluid 1473.0m/s
M22	Medium viscosity
	M22 Medium viscosity 0.0000 cST
M23	Fixed high frequency, no modification is allowed
	M23 Transmitting frequency setting 1-High frequency
M24	The reference distance is given after the parameters of Menu 11-23 are set.
	M24 Transducer installation distance 00000.0mm
M25	The default direction of water flow is from left to right.
	M25 Water flow direction setting 0->>>>
M26	If lower than this parameter, the on-site signal is determined to be abnormal, and the meter does not calculate the flow velocity.
	M26 Minimum signal setting 10
M27	If lower than this parameter, the on-site meter displays a signal of 0.
	M27 Signal removal 100
M28	The noise threshold is 0 by default.
	M28

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	Signal-to-noise ratio threshold <=	0000
M29	The default is 50, and the pipe is determined to be empty when the signal is lower than 50.	
	M29 Empty pipe, signal intensity <=	050
M29A	Default selection, normally not to be modified	
	M29A Signal capture algorithm	X1024 (default)
M29B	Default selection, normally not to be modified	
	M29B Set the number of excitations	001
M30	Metric and imperial unit selection	
	M30 Metric and imperial measurement units	Metric
M31	Instantaneous flow unit: Cubic meter - m ³ (Liter - L, US gallon - gal, Imperial gallon - igl, Mega gallon - mgl, cubic foot - cf, US barrel - ob, Imperial barrel - ib) /second - s (hour - h)	
	M31 Select the instantaneous flow unit	Cubic meter - m ³ /h
M32	Cumulative flow unit: Cubic meter - m ³ , Liter - L, US gallon - gal, Imperial gallon - igl, Mega gallon - mgl, cubic foot - cf, US barrel - ob, Imperial barrel - ib	
	M32 Select the cumulative flow unit	Cubic meter (m ³)
M34	Net cumulative flow switch	
	M34 Net cumulative flow switch	ON

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M35	Positive cumulative flow switch	
	M35 Positive cumulative flow switch	ON
M36	Negative cumulative flow switch	
	M36 Negative cumulative flow switch	ON
M37	Accumulator clearing; it can clear: net cumulative flow, negative cumulative flow, positive cumulative flow, all accumulators, daily records, monthly records, yearly records, all records, all cumulative flow, factory reset, custom records	
	M37 Accumulator clearing operation	Not clearing
M38	The manual accumulator is a stand-alone accumulator that starts as you type and stops when you type again. It is used for the verification and estimation of flow measurement.	
	M38 Manual accumulator	Type ENT when you're ready.
M39	Available in 2 languages: Chinese and English	
	M39 Language selection	Simplified Chinese
M40	The damping coefficient ranges from 0 to 999 seconds. Damping acts to smooth out the displayed data. The damping coefficient value is equivalent to the time constant of the circuit, and the greater the damping coefficient, the greater the delay in the measurement results. Usually enter 5-10 in the application.	
	M40 Damping coefficient	10 Sec
M41	Remove the low-velocity flow so that the system displays "0" at low flow velocity to avoid ineffective accumulation.	
	M41 Low flow velocity removal	0.0000m/s

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M41A Remove the low-velocity flow. You can choose to remove forward, negative, or positive and negative.

M41A
Low flow velocity removal direction
Forward and negative removal

M41B Disabled by default

M41B
Direction recognition enabling
Disabled

M42 After the fluid has completely stopped moving, is stationary and working properly, click 'Enter' to display a zero point, and click 'Enter' again to complete the static zeroing.

M42
Set the static zero point
+0.0000m/s

M43 Select "Clear" to clear the zero point set by the user.

M43
Clear the static zero point
Reserved

M44 Manual input offset time to superimpose to the measured value to obtain the true value

M44
Manual zero point setting
+000.0m3/h

M45 This parameter is also known as the meter coefficient and is used to correct the measurement results. The meter coefficient refers to the ratio of the "true value" to the "indication value". For example, when the measured physical quantity is 2.00 and the meter shows 1.98, its instrument coefficient is 2/1.98.

M45
Scale factor meter coefficient
1.0000

M46 Enter the system identification code, which ranges from 1 to 99.

M46
Network identification address code
01

M47 Factory commissioned

M47

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	System lock, password protection	Locked
M48	Segmental correction of on-site flow; coefficient after calibration of the <Flow Velocity Range>	
	M48 Flow correction curve coefficient	<0.0-0.1>1.0000
M49	Serial port data	
	M49 View the input content of the serial port The data is displayed in this line.	
M50	Set the storage interval; timed storage of measurements at the set time, with 2,000 effective items	
	M50 Data storage interval	3600s
M54	It can be set from 6ms to 1s.	
	M54 OCT pulse width setting	200.000mS
M56	Output current calibration	
	M56 Current output verification	00
M57	The flow value corresponding to the set current loop output value of 20mA	
	M57 Current 20mA output value	010.0 m3
M58	Milliampere correction coefficient	
	M58 Current output correction value K	

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	1.000
M59	If there is a slight deviation between the current value and the actual current output value, you can press +/- to correct and fine-tune the current value, and it is not recommended to correct if the deviation is too large (other reasons need to be checked). M59 Current output correction value B 0.00 mA
M60	Modify the system date and time, and time is in 24-hour format. M60 Date 25-01-01 Time 01-01-01
M61	Electronic serial number and software version number M61 Basic information about the device SN:HU1E5FFFFFFF S250105_V7.1.01A
M62	Set the serial port. The serial port is used to interconnect with other devices. Devices connected with a serial port must have their serial port parameter settings matched. M62 RS-232 serial port settings 9600, 8, N, 1
M63	Select the communication protocol M63 Select the communication protocol MODBUS RTU
M67	Sets the upper limit frequency value of the frequency output signal. The upper limit frequency value shall be greater than the lower limit frequency value, and the value range is 0~9999Hz. Factory default value: 0~1000Hz M67 Frequency output signal range 0000-1000Hz
M68	The flow value at the lower limit frequency point of the corresponding frequency signal M68 Frequency output lower limit value 00000m3/h

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M69 The flow value at the upper limit frequency point of the corresponding frequency signal

M69 Frequency output upper limit value 00010m3/h
--

M70 LCD backlight on time

M70 Display the backlight control options 00360 S

M71 Control the LCD display contrast, turning it up or down to get the proper contrast.

M71 Display contrast control 10

M72 Buzzer alarm switch setting

M72 Buzzer alarm setting ON

M73 Any measured flow below this lower limit value will result in an alarm output of the device.

M73 Flow alarm lower limit value +00.5 m3/h

M74 Any measured flow above this upper limit value will result in an alarm output of the device.

M74 Flow alarm upper limit value +99.9 m3/h

M75 When the flow is between the upper and lower limits, the indicator flashes, which is available in three colors.

M75 Normal state indicator 0-closed

M76 When the flow is below the lower flow limit, the indicator flashes, which is available in three colors.

M76 Low flow alarm indicator 0-closed

M77 When the flow is above the lower flow limit, the indicator flashes, which is available in three colors.

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	M77 High flow alarm indicator 0-closed
M78	Currently available options 1. Positive cumulative pulse output 2、2. Negative cumulative pulse output 3、3. Net cumulative pulse output 4、4. Flow signal output 5. Close the OCT output M78 OCT output selection Close the OCT output
M81	Default parameter, no need to set normally M81 Signal gain setting 200×Gain
M82	Thirty entries can be queried for daily, monthly, and yearly flow M82 Yearly, monthly and daily flow query Daily
M88	Manufacturer's internal commissioning parameters 0000 0, 0, CD: 0900 000+0000, 000, 000 0000, 0000, 0000, D POS: 724 PV: 724.4
M90	Signal intensity, signal quality and transmission ratio M90 000% Signal intensity, quality S=000,000 Q=01+E Signal reception anomaly
M91	Transmission time ratio M91 Signal transmission time ratio 000%
M93	The measured average transmission time of ultrasonic waves M93

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	Signal propagation time difference	+0.00000
M94	The velocity correction coefficient value (or pipe factor) calculated by the current flow meter. This correction coefficient is generally the coefficient of the average linear flow velocity in the pipe.	
	M94 Reynolds coefficient pipe factor	0.4
M101	Default value	
	M101 ADC continuous acquisition times	0050 Times

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bits and 1 stop bit.

The four bytes of 3F 9E 06 51 are the single-accuracy floating-point form of 1.2345678 in IEEE754 format.

Register	Number of registers	Variable name	Data type	Notes
0001-0002	2	Instantaneous flow	REAL4	Unit: m³/h
0003-0004	2	Instantaneous heat flow	REAL4	Unit: GJ/h
0005-0006	2	Fluid velocity	REAL4	Unit: m/s
0007-0008	2	Measurement of the acoustic velocity of the fluid	REAL4	Unit: m/s
0009-0010	2	Positive cumulative flow	LONG	All flow accumulators that use long integers, whose measurement unit is controlled by M32 (i.e., REG1438).
0011-0012	2	Decimal part of positive cumulative flow	REAL4	REAL4 is a standard IEEE-754 format for single-precision floating-point numbers. This format is also commonly referred to as the FLOAT format.
0013-0014	2	Negative cumulative flow	LONG	LONG is a signed long integer preceded by a low character.
0015-0016	2	Decimal part of negative cumulative flow	REAL4	
0017-0018	2	Positive cumulative heat	LONG	All heat accumulators that use long integers, whose measurement unit is controlled by M84 (i.e., REG1441).
0019-0020	2	Decimal part of positive cumulative heat	REAL4	
0021-0022	2	Negative cumulative heat	LONG	
0023-0024	2	Decimal part of negative cumulative heat	REAL4	
0025-0026	2	Net cumulative flow	LONG	
0027-0028	2	Decimal part of net cumulative flow	REAL4	
0029-0030	2	Net cumulative heat	LONG	
0031-0032	2	Decimal part of net cumulative heat	REAL4	
0033-0034	2	Temperature1 / Water supply temperature	REAL4	Unit: °C
0033-0034	2	Temperature1 / Water supply temperature	REAL4	Unit: °C
0035-0036	2	Temperature 2 / Return water temperature	REAL4	Unit: °C
0037-0038	2	Analog input AI3 quantity	REAL4	Converted dimensionless data
0039-0040	2	Analog input AI4 quantity	REAL4	Converted dimensionless data
0041-0042	2	Analog input AI5 quantity	REAL4	Converted dimensionless data
0043-0044	2	Analog input AI3 current value	REAL4	Unit: mA
0045-0046	2	Analog input AI4 current value	REAL4	Unit: mA
0047-0048	2	Analog input AI5 current	REAL4	Unit: mA

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		value		
0049-0050	2	System setup password	BCD	Writable. 00H indicates canceling the password setting.
0051	1	Hardware setup password	BCD	Writable. "A55Ah" indicates on.
0053-0055	3	Date and time of the meter	BCD	Writable. The 6-byte BCD numbers indicate the second, minute, hour, day, month and year, respectively, with the lowest digit first.
0056	1	Day and hour of automatic data storage	BCD	Writable. The 2 bytes indicate the time and day of the start of scheduled data storage. For example, 0312H indicates that data is stored at 12 o'clock on the 3rd day of each month. 0012H indicates that the data is stored at 12 o'clock every day.
0059	1	Enter the key value (Analog keypad)	INTEGER	Writable. Refer to the key value table in the manual.
0060	1	Make the display show Menu X	INTEGER	Writable.
0061	1	Enter the backlight on time	INTEGER	Writable. Unit: s
0062	1	Remaining number of beeps of the buzzer	INTEGER	Writable. Maximum 255 times
0062	1	Number of remaining pulses of OCT	INTEGER	Writable. Maximum 65536
0072	1	Meter operating error code	BIT	See Note 4 for the meaning of each of the 16 bits.
0077-0078	2	Water supply resistance	REAL4	Unit: Ohm
0079-0080	2	Return water resistance	REAL4	Unit: Ohm
0081-0082	2	Total ultrasonic propagation time	REAL4	Unit: μ s
0083-0084	2	Ultrasonic propagation time difference	REAL4	Unit: ns
0085-0086	2	Ultrasonic upstream propagation time	REAL4	Unit: μ s
0087-0088	2	Ultrasonic downstream propagation time	REAL4	Unit: μ s
0089-0090	2	Output current value of the current current loop	REAL4	Unit: mA
0092	1	Operating steps and signal quality	INTEGER	High bytes indicate signal tuning steps and low bytes indicate signal quality; Values range from 0-9, and large values indicate good signals.
0093	1	Upstream signal intensity	INTEGER	Range of value: 0- 4095
0094	1	Downstream signal intensity	INTEGER	Range of value: 0- 4095
0096	1	Operation interface language	INTEGER	0 for Chinese, 1 for English
0097-0098	2	Ultrasonic signal transmission ratio	REAL4	Normal range: 100+/-3%
0099-0100	2	Current Reynolds number	REAL4	
0101-0102	2	Current Reynolds	REAL4	

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		correction coefficient		
0103-0104	2	Time of the working timer	LONG	Unsigned, Unit: s
0105-0106	2	Total working time	LONG	Unsigned, Unit: s
0105-0106	2	Total number of power-ups	LONG	Unsigned
0113-0114	2	Net cumulative flow (in floating point form)	REAL4	Unit: cubic meter, 7 significant digits
0115-0116	2	Positive cumulative flow (in floating point form)	REAL4	Unit: cubic meter, 7 significant digits
0117-0118	2	Negative cumulative flow (in floating point form)	REAL4	Unit: cubic meter, 7 significant digits
0119-0120	2	Net cumulative heat (in floating point form)	REAL4	Unit: GJ, 7 significant digits
0121-0122	2	Positive cumulative heat (in floating point form)	REAL4	Unit: GJ, 7 significant digits
0123-0124	2	Negative cumulative heat (in floating point form)	REAL4	Unit: GJ, 7 significant digits
0125-0126	2	Today's cumulative flow (in floating point form)	REAL4	Unit: cubic meter, 7 significant digits
0127-0128	2	Cumulative flow for the month (in floating point form)	REAL4	Unit: cubic meter, 7 significant digits
0129-0130	2	Manual accumulator flow	LONG	
0131-0132	2	Decimal part of manual accumulator	REAL4	
0133-0134	2	Cumulative flow of batch controller	LONG	
0135-0136	2	Decimal part of batch controller	REAL4	
0137-0138	2	Today's cumulative flow	LONG	
0139-0140	2	Decimal part of today's cumulative flow	REAL4	
0141-0142	2	Cumulative flow for the month	LONG	
0143-0144	2	Decimal part of the cumulative flow for the month	REAL4	
0145-0146	2	Cumulative flow for the year	LONG	
0147-0148	2	Decimal part of the cumulative flow for the year	REAL4	