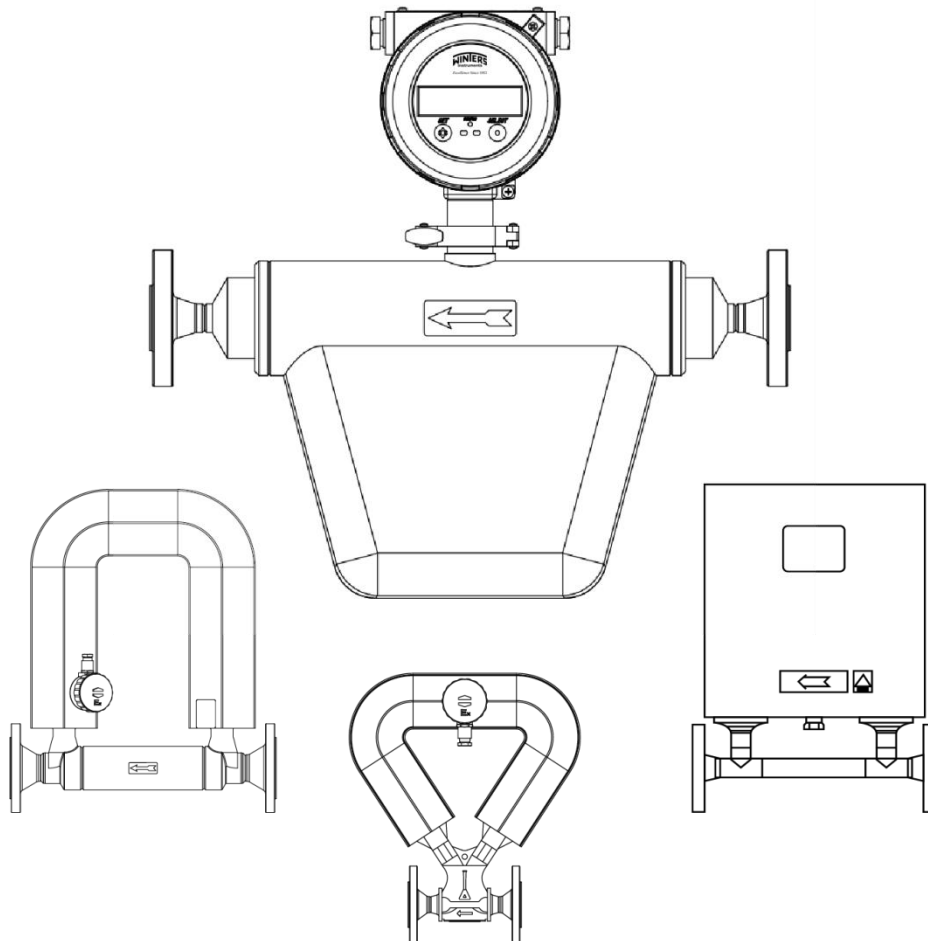


Operation manual

FMS

Series mass flowmeter



Winters Instrument

V1.0

Catalogue

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Introduction

This manual describes in detail the outline structure, design principle, product specifications, product installation and other contents of our mass flowmeter. Please read this manual carefully before installation.

Products are based on the following standards:

GB 3836.1-2010 Explosive atmospheres - Part 1: general requirements for equipment

GB 3836.2-2010 Explosive atmospheres-Part 2: flameproof type "d"

GB 3836.4-2010 Explosive atmospheres - Part 4: Equipment protected by intrinsically safe type "i"

GB/T 17626.2-2006 Electromagnetic compatibility test and measurement techniques Electrostatic discharge immunity test

GB/T 17626.4-2006 Electromagnetic compatibility test and measurement techniques Electrical fast transient pulse group immunity test

IEC 60079-0:2017 Electrical equipment for use in explosive atmospheres - Part 1: General requirements

IEC 60079-1:2014 Electrical equipment for use in explosive atmospheres - Part 2: flameproof type "d"

IEC 60079-11:2011 Electrical equipment for use in explosive atmospheres - Part 2: intrinsically safe "i"

GB4208-2008/IEC60529:2001 enclosure protection class (IP code)

Products comply with GB/T 31130-2014 Coriolis mass flowmeter national standard, have passed the relevant explosion-proof certification. Do not replace relevant parts without permission to prevent function damage. And the sensor and transmitter must be used together.

The main power supply must be cut off before installation. When opening the explosion-proof case, carefully protect the surface of the explosion-proof case. During installation, ensure that the surface of the explosion-proof case is not damaged, the line connection is normal, and no metal gaskets, rubber seals and fastening screws are missing; Ensure electrical explosion-proof devices are in normal operation.

1. Performance and specifications

1.1 Introduction

The mass flowmeter produced by our company adopts the latest technology of international mass flowmeter, which has a series of advantages such as beautiful appearance, reliable performance and high accuracy, and is welcomed by the majority of users. Mass flowmeter is used to measure the mass flow of the fluid in the flow diameter pipeline, and is widely used in chemical industry, electric power, mining and metallurgy, drainage, paper making, medicine, food and other fields.

1.2 Operating Environment Conditions

Atmospheric pressure: 85kPa ~ 106kPa

Ambient temperature: -40~+60°C

Relative humidity: 5% ~ 95% (non-condensing)

1.3 Working Conditions

Measuring medium: liquid/gas

Medium temperature: universal (-40°C ~ +200°C); Cryogenic type (-198°C ~ +100°C);

High temperature type (-40°C ~ +350°C)

Steam tracing: the internal working pressure of the thermal insulation jacket is less than 0.5MPa

Nominal pressure: 4MPa, 10MPa, 25MPa

Power supply voltage: AC (85 ~ 265) VAC, 50/60Hz DC DC (12 ~ 36) VDC, 5W

Output/Communication: Pulse (0 ~ 10) kHz, RS485, (4~20) mA, HART, PROFIBUS DP/PA

1.4 Use area and explosion-proof parameters

The flowmeter should meet the requirements of GB 3836.1-2010, GB 3836.2-2010, GB 3836.4-2010 Ex db IIC T6 Gb. It is suitable for explosive dangerous gas environment in Zone 1, Zone 2, temperature group T6.

The explosion-proof instrument mark is Ex db ia IIC T6 Gb, manufactured according to the drawings and technical documents approved by the national designated explosion-proof verification institution, and the "" explosion-proof certificate" is obtained.

2. Composition

Coriolis mass flowmeter consists of two parts: sensor and transmitter. GB/T 31130-2014 implementation standard.

2.1 Sensor

The sensor is a kind of phase sensitive resonant instrument based on Coriolis force effect, which is mainly composed of vibration tube, signal detector, vibration driver, support structure and shell.

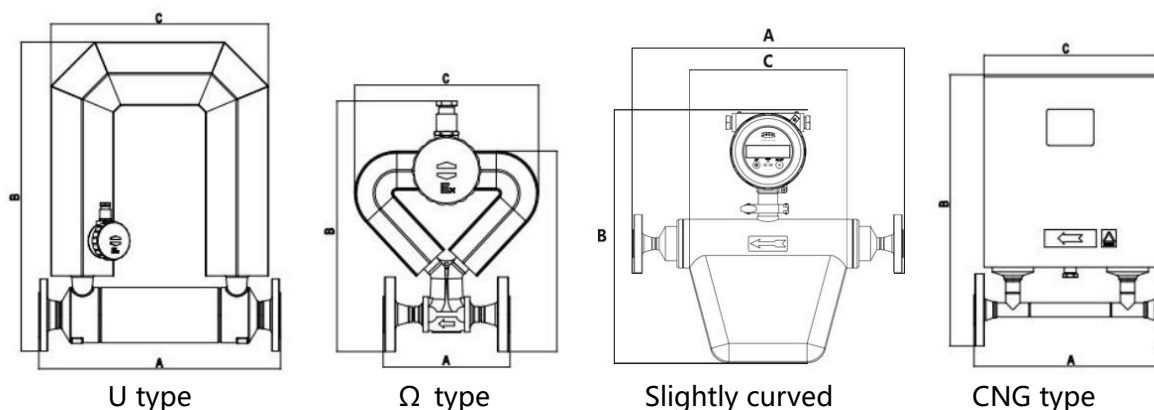
2.1.1 Basic Parameters and Performance Specifications

Table 2-1 Technical performance of the sensor

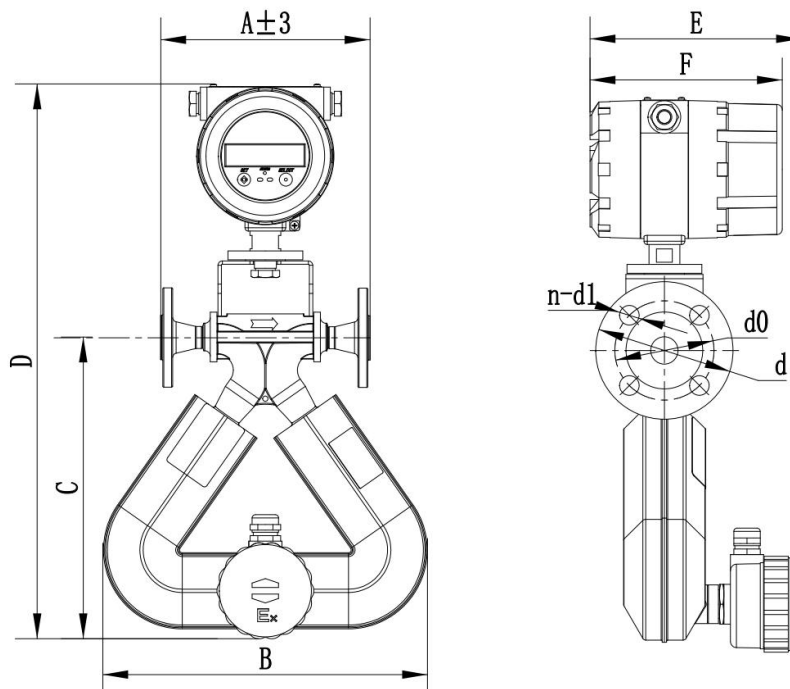
item	Technical performance
accuracy	Grade 0.1, 0.15, 0.2
Measuring tube material	316L/Hastelloy
Enclosure protection	IP65, IP67

2.1.2 Sensor dimensions

Our company's sensor is divided into U type, Ω type, micro bending type, CNG type four series.



Ω type integrated shape and mounting size



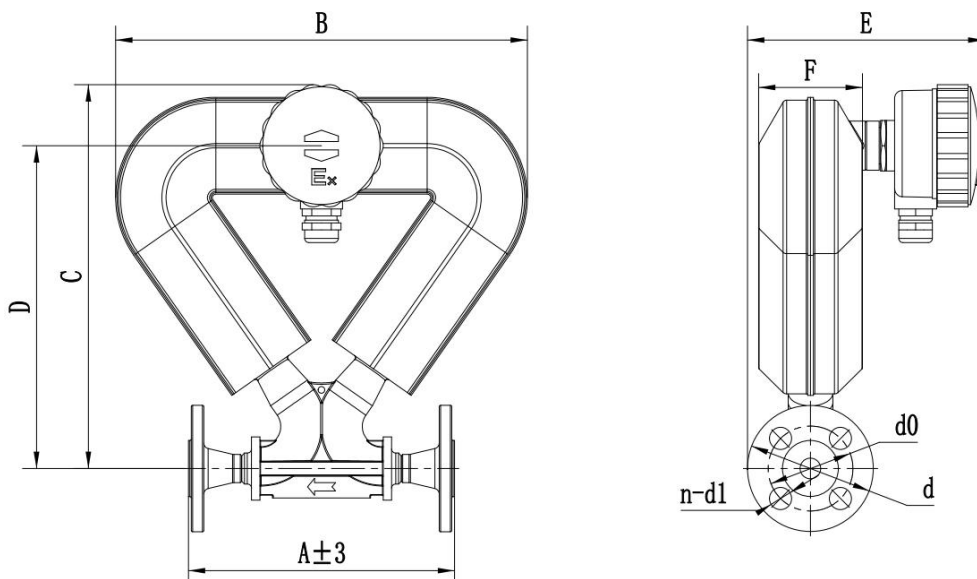
Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									

03	15(Standard configuration)	4.0	196	243	207	400	231	175	14	65	95
06	15(Standard configuration)	4.0	160	235	226	448	181	175	14	65	95
15	15(Standard configuration)	4.0	190	293	273	495	220	175	14	65	95
25	25(Standard configuration)	4.0	210	448	430	657	230	175	14	85	115
40	40(Standard configuration)	4.0	260	552	514	800	251	175	18	110	150

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
03	15(Standard configuration)	300	224	243	208	255	176	175	16	66.7	95
06	15(Standard configuration)	300	188	235	226	448	181	175	16	66.7	95
15	15(Standard configuration)	300	218	295	273	503	192	175	16	66.7	95
25	25(Standard configuration)	300	254	448	429	664	212	175	18	88.9	125
40	40(Standard configuration)	300	313	576	561	800	251	175	22	114.3	155

Ω type split shape and mounting size

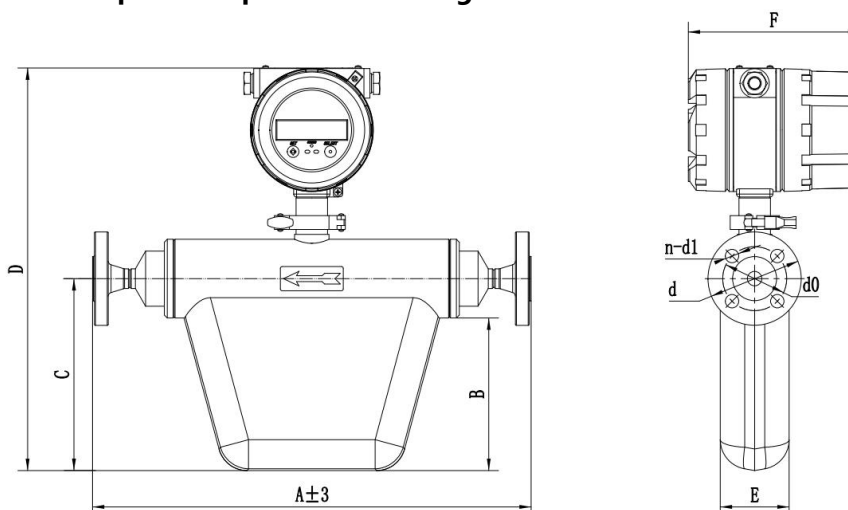


Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									
03	15(Standard configuration)	4.0	196	243	207	164	176	64	14	65	95
06	15(Standard configuration)	4.0	160	235	226	183	160	53	14	65	95
15	15(Standard configuration)	4.0	190	293	273	230	172	74	14	65	95
25	25(Standard configuration)	4.0	210	448	430	376	218	117	14	85	115
40 新	40(Standard configuration)	4.0	260	552	514	413	221	137	18	110	150

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d ₁	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
03	15(Standard configuration)	300	224	243	207				16	66.7	95
06	15(Standard configuration)	300	188	235	226				16	66.7	95
15	15(Standard configuration)	300	218	295	273				16	66.7	95
25	25(Standard configuration)	300	254	448	430				18	88.9	125
40 新	40(Standard configuration)	4.0							18	110	150

Slightly curved one-piece shape and mounting dimensions

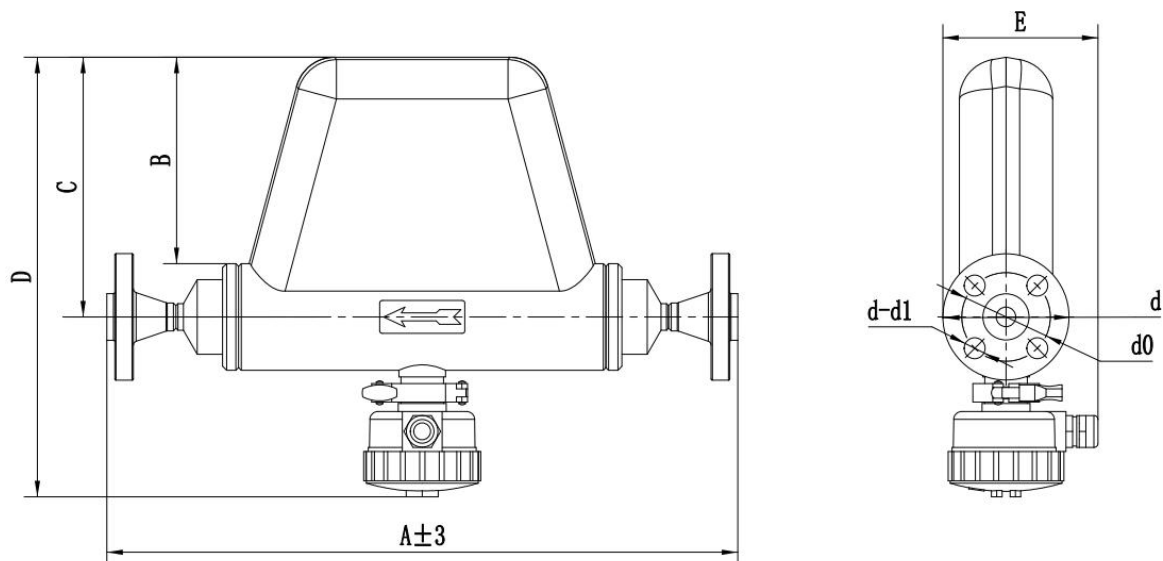


Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									
15	15(Standard configuration)	4.0	446	155	195	409	70	175	14	65	95
25	25(Standard configuration)	4.0	588	143	196	426	100	175	14	85	115
50	50(Standard configuration)	4.0	880/ 815	350	444	713	146	175	18	125	165
	65										

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
15	15(Standard configuration)	300	474		195	409	70	175	16	66.7	95
25	25(Standard configuration)	300	632		196	426	100	175	18	88.9	125
50	50(Standard configuration)	300	924/ 859		444	713	146	175	18	127	165
	65	300									

Slightly curved split shape and mounting dimensions

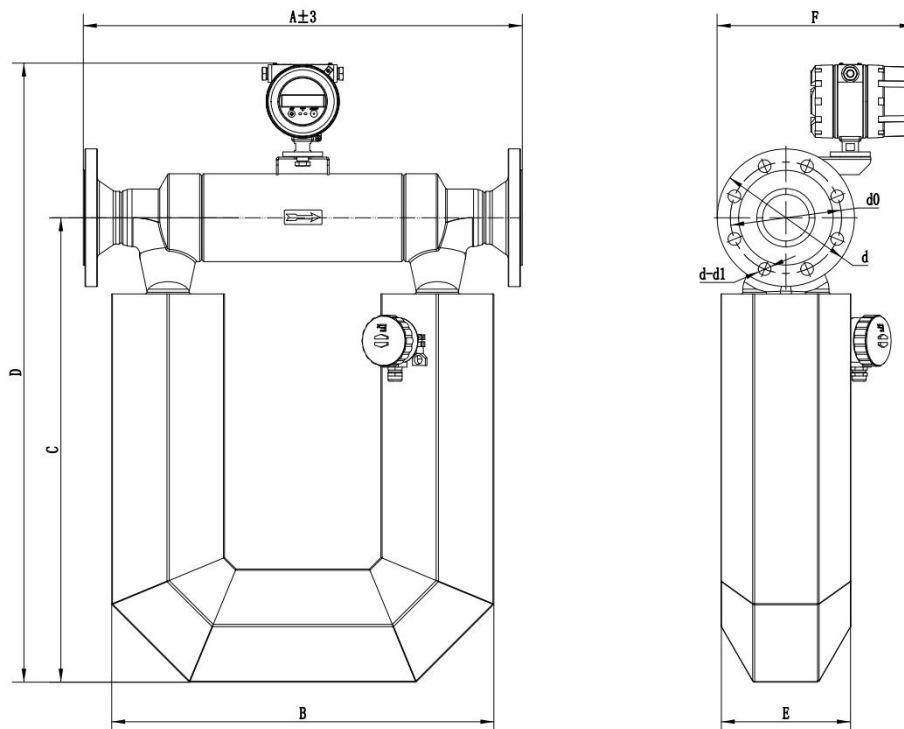


Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									
15	15(Standard configuration)	4.0	446		195	330	117		14	65	95
25	25(Standard configuration)	4.0	580/588		196	330	146		14	85	115
50	50(Standard configuration)	4.0	880/815		383	560	151		18	125	165
	65	4.0									

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
15	15(Standard configuration)	300	474		195	330	117		16	66.7	95
25	25(Standard configuration)	300	624/632		196	330	146		18	88.9	125
50	50(Standard configuration)	300	924/859		383	560	151		18	127	165
	65	300									

U-shape integrated shape and mounting size

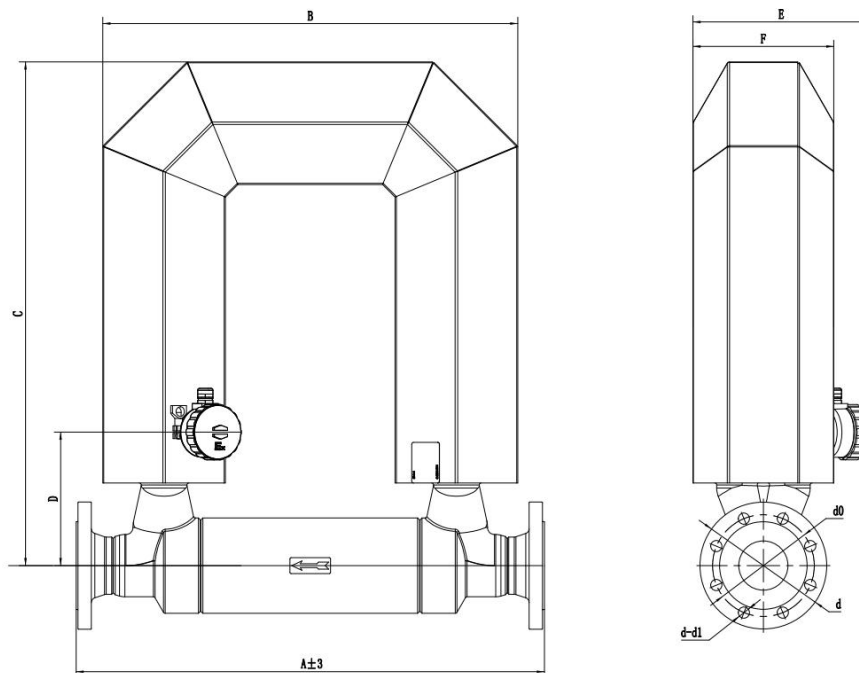


Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									
20	25(Standard configuration)	4.0	356	287	363	568	99	175	14	85	115
50	50(Standard configuration)	4.0	551/545	506	629	866	165	270	18	125	165
	65(optional)		572	506	629	866	165		18	145	185
80	80(Standard configuration)	4.0	730/715/745	653	793	1056	222	335	18	160	200
	100(optional)		745	653	793	1056	222		22	190	235
100	100(Standard configuration)	4.0	755	709	1044	1352	345		22	190	235
	150(optional)								26	250	300
150	150(Standard configuration)	4.0		907					26	250	300
	200(optional)								30	320	375

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
20	25(Standard configuration)	300							18	88.9	125
50	50(Standard configuration)	300							18	127	165
	65(optional)								22	149.2	190
80	80(Standard configuration)	300							22	168.3	210
	100(optional)								22	200	255
100	100(Standard configuration)	300							22	200	255
	150(optional)								22	269.9	320
150	150(Standard configuration)	300							22	269.9	320
	200(optional)								26	330.2	380

U-shaped split shape and mounting dimensions



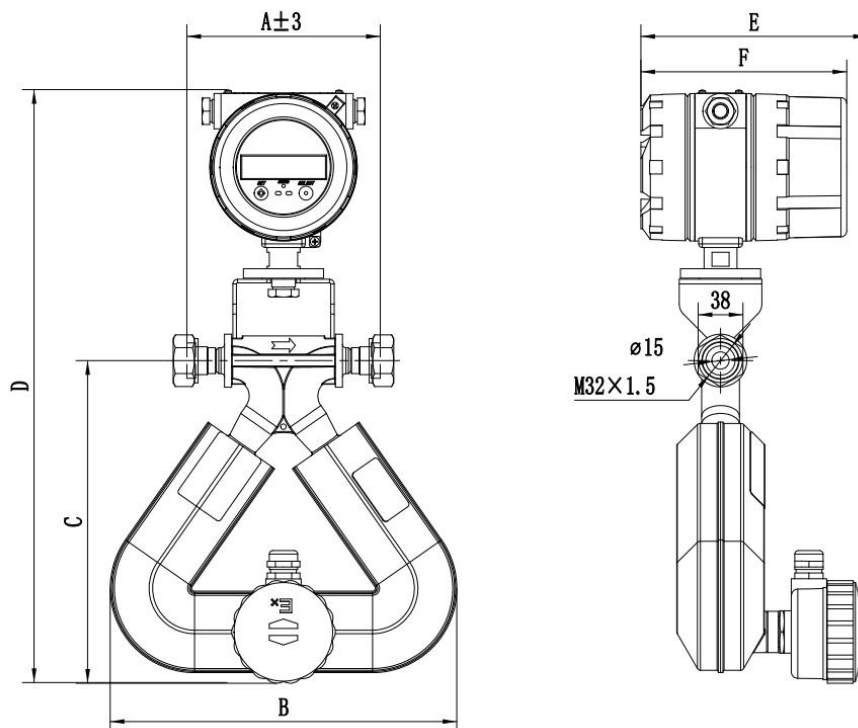
Note: The flanges listed in the table are welded steel pipe flanges

The flange (GB/T 9115-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (HG/T 20592-2009)											
Model	DN(mm)	PN(MPa)									
20	25(Standard configuration)	4.0	356	287	363	123	122	99	14	85	115
50	50(Standard configuration)	4.0	552	506	628	170	203	166	18	125	165
	65(optional)								18	145	185
80	80(Standard configuration)	4.0	730	653	793	210	278	222	18	160	200
	100(optional)								22	190	235
100	100(Standard configuration)	4.0	728	709	1044	220	345	298	22	190	235
	150(optional)										
150	150(Standard configuration)	4.0	972	907	1171	281	393	353	26	250	300
	200(optional)								30	320	375
200	200(Standard configuration)		1098	907	1280		445				
	250(optional)										
250			1310	1087	1470		535				

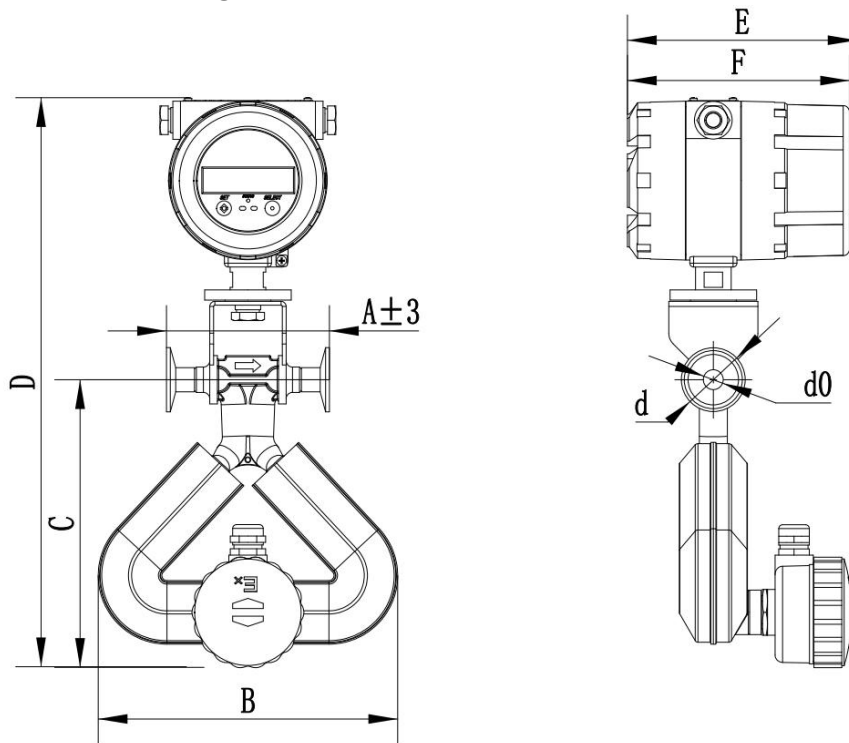
300											

The flange (HG/T 20615-2010)			A	B	C	D	E	F	n-d1	d0	d
The flange (ASME B16.5-2009)											
Model	DN(mm)	PN(Class)									
20	25(Standard configuration)	300							18	88.9	125
50	50(Standard configuration)	300							18	127	165
	65(optional)								22	149.2	190
80	80(Standard configuration)	300							22	168.3	210
	100(optional)								22	200	255
100	100(Standard configuration)	300							22	200	255
	150(optional)								22	269.9	320
150	150(Standard configuration)	300							22	269.9	320
	200(optional)								26	330.2	380

Screw shape and mounting dimensions



Clamp shape and mounting size



2.1.3 Installing the sensor junction box

Sensor junction box installation mode: 180° adjustable.

180° adjustable: The sensor junction box body and the sensor installation mode is to connect the glass terminal to the PCB board through the welding of the wire, so that the sensor junction box can be adjusted at 180°. Note that if the adjustment amplitude exceeds 180°, the glass terminal pin in the junction box will be damaged. Figure 2-2

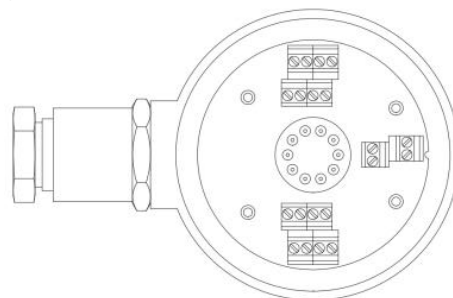


Figure 2-2 180° adjustable mode

2.2 Transmitter

The transmitter provides the driving force for the sensor, converts the sensor signal into the mass flow signal and other parameter signals, and has the function of compensating the mass flow measurement according to the temperature parameter.

2.2.1 Product Function Description

(1) Basic functions

has the parameter correction function, can adapt to different media;

Measurable values: density, temperature, mass, or volume (see Table 5-5 for specific units).

Communication function: MODBUS RS-485, (4~20) mA, HART protocol;

There are three internal calculators, can be recorded: mass total, volume total and density calculation;

Real-time total record function.

(2) Transmitter wiring and installation

The transmitter is composed of a switching power supply, a safety grid board and a host board, and is installed in the F-type transmitter terminal box. The switching power supply provides the working power of the whole transmitter, and the safety grid plate is installed under the main board, which is mainly responsible for the intrinsic safety isolation between the sensor and the transmitter; The host board mainly detects and processes the phase signal of the sensor, outputs the mass flow signal and processes the communication.

2.2.2 Basic Parameters and Performance Specifications

(1) Transmitter

Power: $\leq 5W$

Display and button: wide viewing Angle, wide temperature, with backlight display, used to display flow, flow unit, total amount, alarm and alarm type. Infrared sensor key SET/SELECT is used to set and select all working parameters.

(2) Internal calculator

Three calculators (mass, volume and density calculation);

(3) Working parameter setting and programming

Directly use the infrared sensor key, or use a wide receiver operator, PC (RS232) to program the transmitter;

(4) 485 communication port

The transmitter is connected to the upper computer through RS485 communication port and adopts Modbus RTU transmission protocol. Please contact the company for details of the protocol.

(5) Pulse signal output

The transmitter pulse output is a passive OC gate output, which can be connected to an electronic counter. The factory default is 0.1g for each pulse, and the user can contact the company to set other values or use the upper computer communication when ordering.

2.2.3 Outline size of transmitter

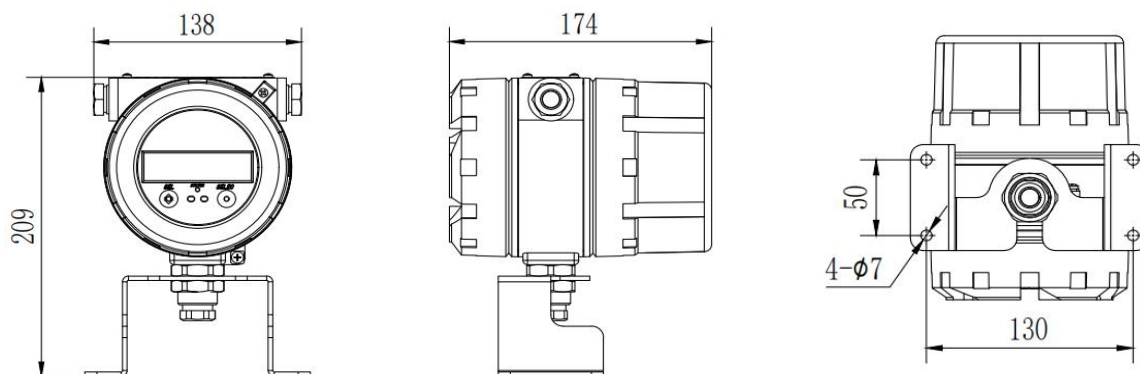


Figure 2-3 Dimensions of the transmitter

3. Installation





The design, test and power supply of the mass flow meter have safety regulations, and the user must strictly abide by the relevant provisions of this manual to ensure the safe operation and operation of the flow meter.

3.1 Precautions

- a) Before selecting the location and installing the flow meter, you must read the relevant parts of this manual, taking into account the safety requirements of the mass flow meter, related equipment and the fuselage environment;
- b) Installation and maintenance of the instrument should be carried out by personnel with certain knowledge of the instrument;
- c) Correctly install the sensor and piping of the flowmeter to ensure safe and reliable sealing, and the fluid pressure shall not exceed the maximum working pressure specified on the nameplate;
- d) Take certain measures to prevent electric shock accidents;
- e) The installation equipment of the flow meter shall comply with the safety regulations.

3.2 Check Before Installation

- a) Check the flange, shell and outlet sleeve for damage;
- b) Open the box cover and check whether the wiring and wiring panel are loose or damaged;
- c) Check whether the model number in the nameplate is consistent with the order number.

Warning sign	Warning interpretation	Risk
	EX- Danger zone warning	Guidelines must be followed to comply with hazardous area certification
	High pressureConventional hazard	Risk of electric shock
	Surface overheating or high temperature	A regular danger that can cause injury to the character
	Warning interpretation	Risk of scalding

3.3 Installation

3.3.1 Installation Procedure

- a) Working environment: When selecting the installation location of the sensor, the installation area, pipeline, transmitter location and valve location should be considered;
- b) Installation direction: Determine the installation direction according to the arrow on the sensor;
- c) Installation: Install sensors and transmitters on the pipeline;
- d) Connection: 9-core shielded cable must be connected between the transmitter and the sensor;
- e) Start.

3.3.2 Location Selection

a) The sensor must be installed away from mechanical vibration sources, such as pipes containing pumps. If strong pipe vibration is unavoidable, it is recommended to isolate the pipe system from the instrument sensor with a flexible pipe. The shell remains independent and must not come into contact with other objects. If multiple sensors need to be installed on a pipeline, the effect of resonance between the sensors should be prevented. At this time, the distance between the two sensors must be greater than 3 times their width.

b) When installing the sensor, it is necessary to consider the phenomenon of thermal expansion and cold contraction on the installation pipe caused by the change of ambient temperature. In addition, the thermal expansion and contraction reaction of the pipe will affect the zero point of the sensor, which may affect the accuracy of the measurement. Therefore, do not install the sensor in the thermal expansion of the pipe node.

c) The sensor installation must be away from industrial electromagnetic field sources, such as large generators, transformers, etc. In addition, the vibration exciter in the sensor internal detection pipeline will also be affected, and the weak internal detection signal will also be reduced by electromagnetic noise interference. Therefore, the sensor must be installed at least 5 meters away from these field sources.

d) When measuring liquid, the fluid flow should be as far as possible from the bottom to the top, and the instrument should not be installed at the highest point of the pipeline to avoid pipeline gas accumulation affecting the normal operation of the instrument.

e) The sensor should be installed in the lower part of the pipe so that the fluid can fill the sensor and enable the normal operation of the zero drift calibrator.

f) When measuring gas, the gas should be as far as possible from the top to the bottom, while avoiding the instrument installed at the lowest part of the pipeline, so as to avoid the accumulation of pipeline liquid affecting the normal operation of the instrument.

g) When it is necessary to install in dangerous areas, it is necessary to ensure that the installation environment of the flow meter is within the explosion-proof parameter coefficient on the nameplate of the mass flow meter.

Note: If the installation site is vulnerable to sun exposure, shelter should be added. Avoid strong vibration and excessive temperature changes, while preventing corrosive liquid dripping. The magnetic field strength of the installation site should be less than 400A/m.

3.3.3 Connecting Pipes

First of all, note that the sensor itself cannot be used as a load support point, it cannot support the adjacent working pipe. The load should be borne by the pipe holding it. At the same time, the sensor should be installed so that it is not subjected to large tension stress, and the stress effect caused by expansion of the adjacent pipe should be considered.

Note that the installation method is different when the measured medium is different.

A: If the measured flow body is a liquid, the sensor is generally installed with the shell facing down to avoid air accumulation in the sensor vibration tube, so as to achieve the purpose of accurately measuring the mass flow rate.

B: If the measured flow body is a gas, the sensor is generally installed with the shell facing upward

to avoid condensation accumulation in the sensor vibration tube, so as to achieve the purpose of accurately measuring the mass flow rate.

C: If the measured fluid is a mixture of liquid and solid slurry, install the sensor on a vertical pipe, which can avoid the accumulation of particles in the sensor measurement tube. In addition, if the process line needs to be cleaned with gas and steam, this installation is easy to clean. See the following figure for details:

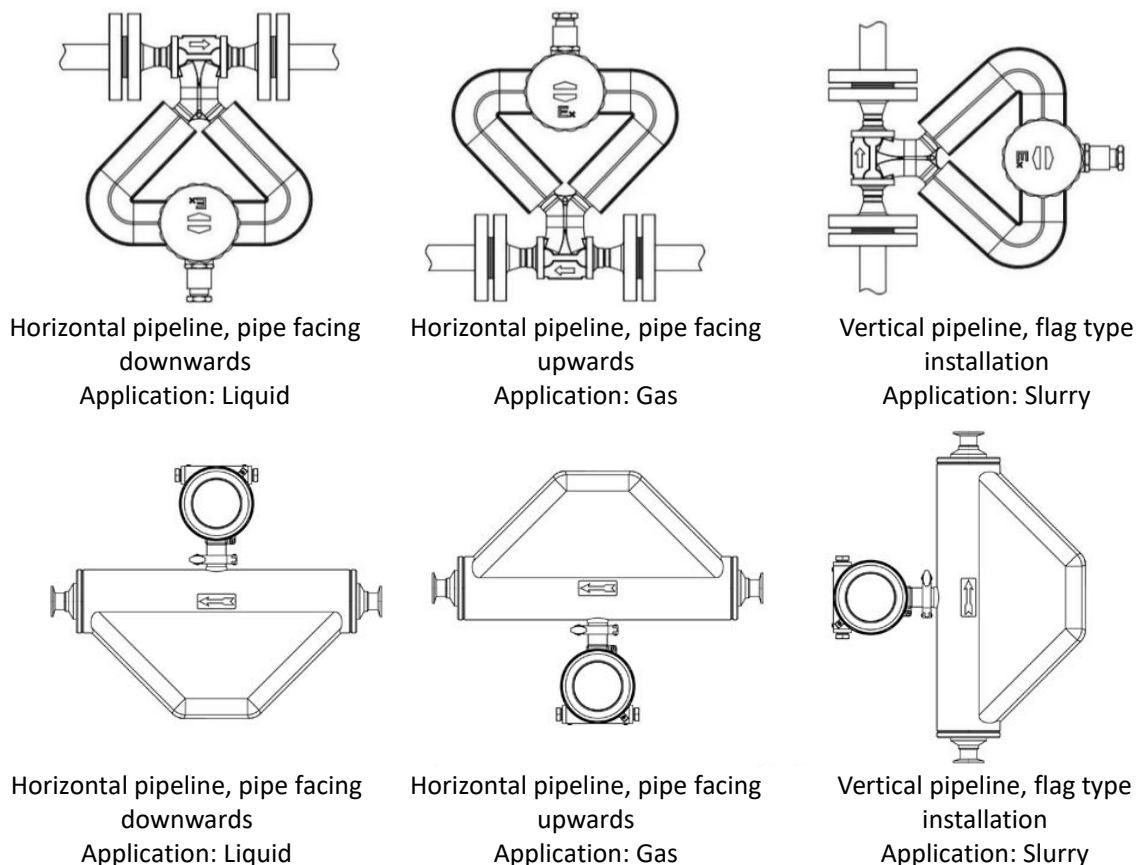


Figure 3-1 Pipeline installation diagram of the Ohm and micro-curved mass flowmeters

3.3.4 Grounding

The flow signal generated by the sensor is very small, and only a few millivolts at full scale, so the sensor should be kept well grounded. The grounding requirements of mass flowmeters have two aspects:

From the working principle of the mass flowmeter and the flow induction signal current loop analysis, the ground terminal of the sensor and transmitter must be the same potential as the measured medium;

The earth is zero potential to reduce external interference. Under normal circumstances, the process pipes are metal pipes, which are themselves grounded, which is easy to meet. However, in the case of large interference from external electromagnetic fields, the mass flowmeter needs to be equipped with a ground device. The ground wire is multi-strand copper wire with a total cross-section greater than 4mm². The ground wire of the sensor must not be connected to the public ground wire of the motor or other equipment. The ground resistance must be less than 10 ohms.

3.3.5 Other Requirements

When installing the sensor, it should be ensured that the measuring tube is coaxial with the process pipe, and the axis deviation of the sensor with a nominal diameter of 50mm and below is not more than 1.5mm;

The flange gasket installed between the flanges should have good corrosion resistance, and the gasket should not be extended into the pipeline;

The screws and nuts fastening the instrument shall be intact and well-lubricated. Use torque wrench to tighten bolts according to flange size and torque.

When welding or flame cutting is performed in the pipeline adjacent to the sensor, isolation measures should be taken to prevent heat.

4. Electrical wiring and circuits

In order to ensure the reliable sealing of the outlet sleeve, the circular section cable should be used when wiring.

4.1 Connecting Cables

The connection between the mass flow meter sensor and the transmitter has been matched by our company, and this section is only applicable to the separation flow meter. Sensor and transmitter indirect line cable users should order to our company according to the actual distance. All output cables and power cables are provided by the user.

4.1.1 Adjusting the direction of display components

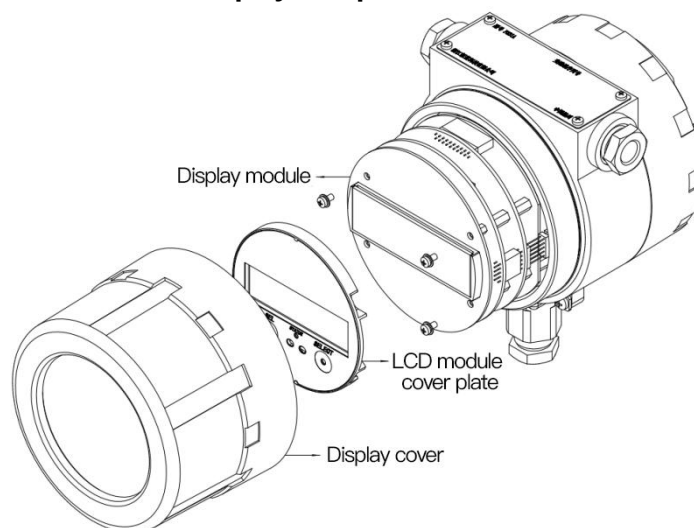


Figure 4-1 Schematic diagram of the transmitter display board

If the transmitter is equipped with a display, turn the display cover counterclockwise, remove the LCD module cover, remove the screw, remove the 6P line, and rotate the display module at 180°.

4.1.2 Connecting Power Cables

The transmitter input power is either 220VAC AC or 24VDC DC. When the cross-sectional area of a power cable is greater than 0.8mm, the maximum cable length should not exceed 300m.

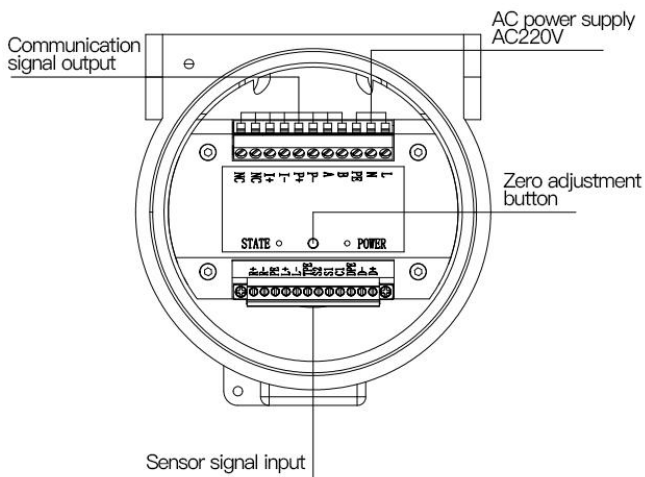


Figure 4-2 Cable connection diagram of the transmitter

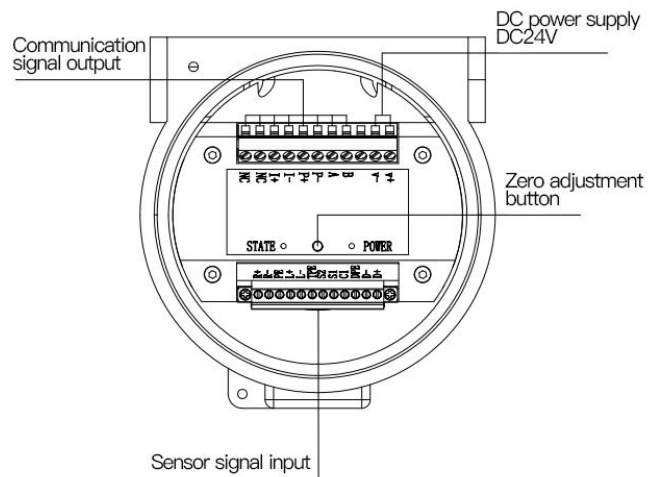


Figure 4-3 Dual current connection diagram of the transmitter

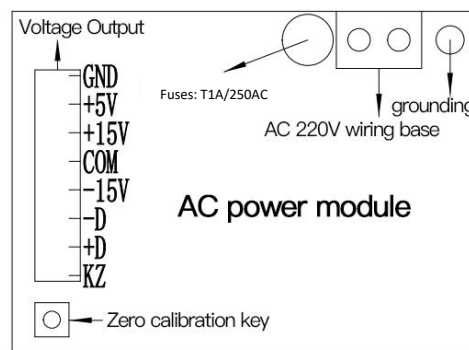
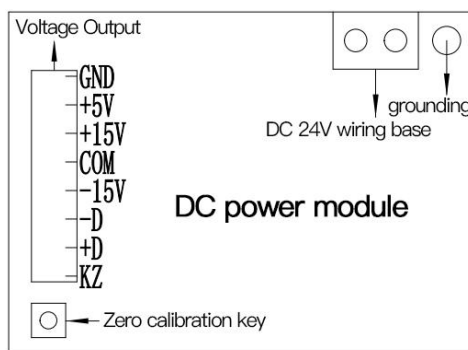


Figure 4-4 Power module of the transmitter

4.1.3 Cable Connection Requirements

Note: All wiring should be done after cutting off the power supply.

- a) After confirming the cable model, wiring shall be carried out according to the regulations, and the wiring shall be correct and firm;
- b) Insert the cable into and out of the cable sleeve according to the correct procedure: first loosen the compression nut of the cable sleeve and remove the plug plate. Apply a compression nut and rubber ring to the cable sleeve at one time. Then thread the cable into and out of the cable sleeve. After the wiring is completed, straighten out the cable and tighten the compression nut to make the rubber ring compress the cable;
- c) When stripping the cable, be careful not to damage the insulation layer that should be retained. For the flow signal core wire, as long as it can be connected, the shielding layer should be stripped as little as possible.

4.2 Circuit

4.2.1 Basic Requirements

When the sensor and transmitter of the mass flow meter are installed as a whole, the power problem of connecting the transmitter is easily solved. If the sensor and transmitter are installed separately, our company's special 9-core shielded cable should be used (in which the shielded cable is split into 3 to form a special 12-core cable), and other cables cannot be used instead, so as not to affect the measurement error. The cable connecting the sensor and transmitter should not be covered on the motor and other power equipment to avoid the impact of electromagnetic field on the measurement. The maximum line length of the lead cable should not exceed 100m.

4.2.2 Junction Box

When the sensor and transmitter are installed separately, the sensor and transmitter need to be paired with a junction box to connect a 9-core shielded cable as a signal line.

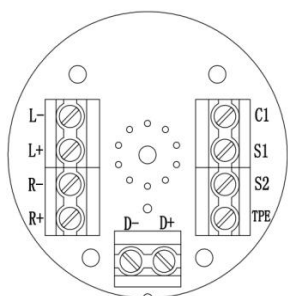


Figure 4-5 CCG sensor connector panel

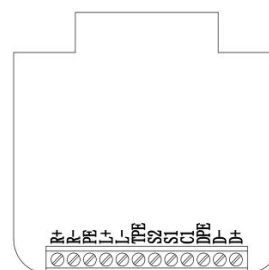


Figure 4-6 F100 transmitter terminal panel

The connection definition of the sensor signal output 10-point terminal:

Table 4-1 Definition of sensor terminals

designation	L-	L+	R-	R+	D-	D+	TPE	S2	S1	C1
colour	The purple	grey	yellow	white	red	blue	Black (shielding)	black	green	orange
Feature	Left coil detection		Right coil detection		Coil drive		Temperature detection			

Transmitter signal output 12-point terminal wiring definition:

Table 4-2 Definition of transmitter terminals

designation	L-	L+	R-	R+	D-	D+	TPE	S2	S1	C1
colour	The purple	grey	yellow	white	red	blue	Black (shielding)	black	green	orange
Feature	Left coil detection		Right coil detection		Coil drive		Temperature detection			

Note: Be sure to turn off the power before wiring. The supply voltage must be equal to the voltage displayed on the transmitter junction box. The grounding device must be connected with a grounding wire to ensure the safe use of the flowmeter.

4.2.3 Connection diagram of mass flowmeter and pulse receiver

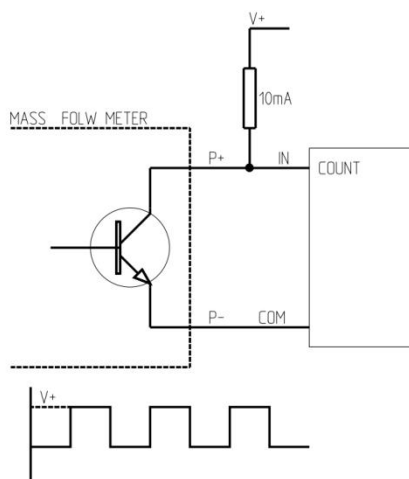


Figure 4-7 Connection diagram of the pulse receiver

The resistance value of R in the figure is determined according to the user's field cable length and the maximum received pulse frequency of the pulse receiver, generally 10mA can meet most applications, if the cable is too long, the resistance value can be appropriately reduced, the maximum current does not exceed 50mA, the user can use the fixed frequency output function of the software to test whether the connection and resistance are reasonable.

4.2.5 Startup

After the device is installed, check whether the transmitter parameters are consistent with those marked on the sensor nameplate. The calibration medium before delivery is clean water. If it is used in other media, zero calibration is recommended. For details, see 7.2.13.

Before calibration:

- * Turn on the flow meter power supply, preheating should not be less than 30 minutes;
- * The measured flow body through the flow meter until the sensor temperature is close to the normal process temperature;
- * Close the stop valve downstream of the sensor;
- * Ensure that the flowmeter is in full tube condition;
- * Ensure that the measured flow has stopped completely.

Note: If the sensor zero calibration is not correct, it will lead to inaccurate measurement results. If the above situation occurs, stop using the flowmeter or reset the flowmeter.

Recommendation: According to international standards, it is recommended to check the zero point every week within the first month of the sensor being put into operation. If the change of zero is relatively small, then the number of inspection intervals can be reduced.

5. Instrument Interface

5.1 Introduction to the Operation Interface

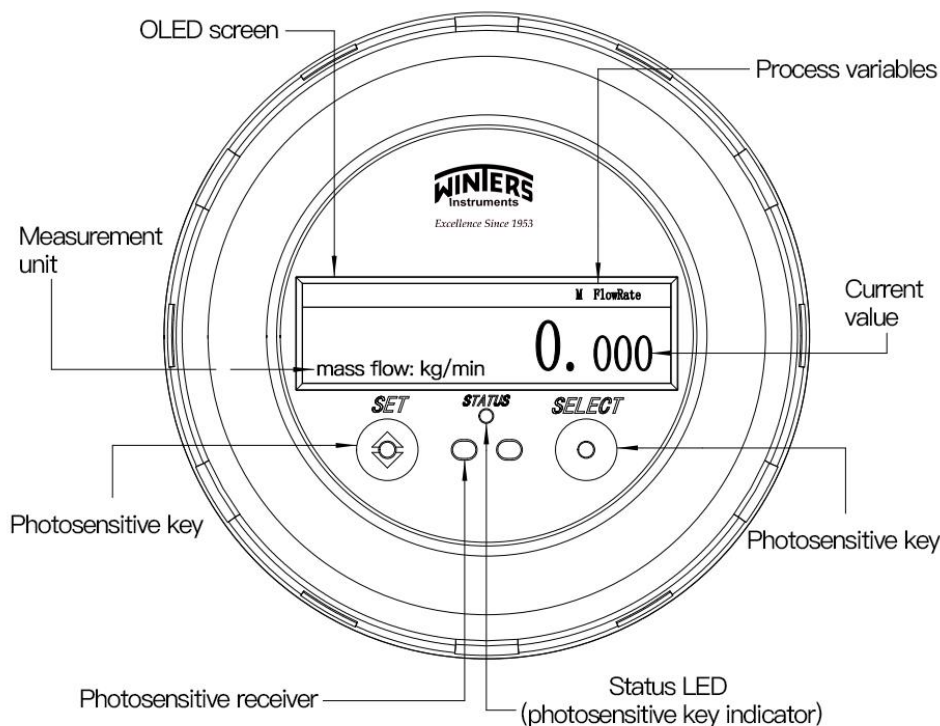


Figure 5-1 Operation panel

The operation panel includes the SET action sensor and the SELECT action sensor (hereinafter referred to as the key). There is a two-color LED indicator directly below the operation panel. The green indicator is the system running indicator, which blinks at a 1s interval during the system running. The red indicator is used as the trigger indicator of the action sensor. When the system recognizes the action, it lights up or blinks according to different action types.

5.1.1 Error Code Prompt

The mass flowmeter will self-diagnose during operation. When the Error font flashes on the main interface screen, it indicates that the flowmeter has a problem that needs to be solved:

- | | |
|---------------------------------------|--|
| 1. Error 01 (Sensor Error) | 2. Error 02 (Temperature sensor exceeds limit) |
| 2. Error 03 (Zero calibration failed) | 4. Error 04 (Transmitter initialization) |

5.2 Overall block diagram of the system interface

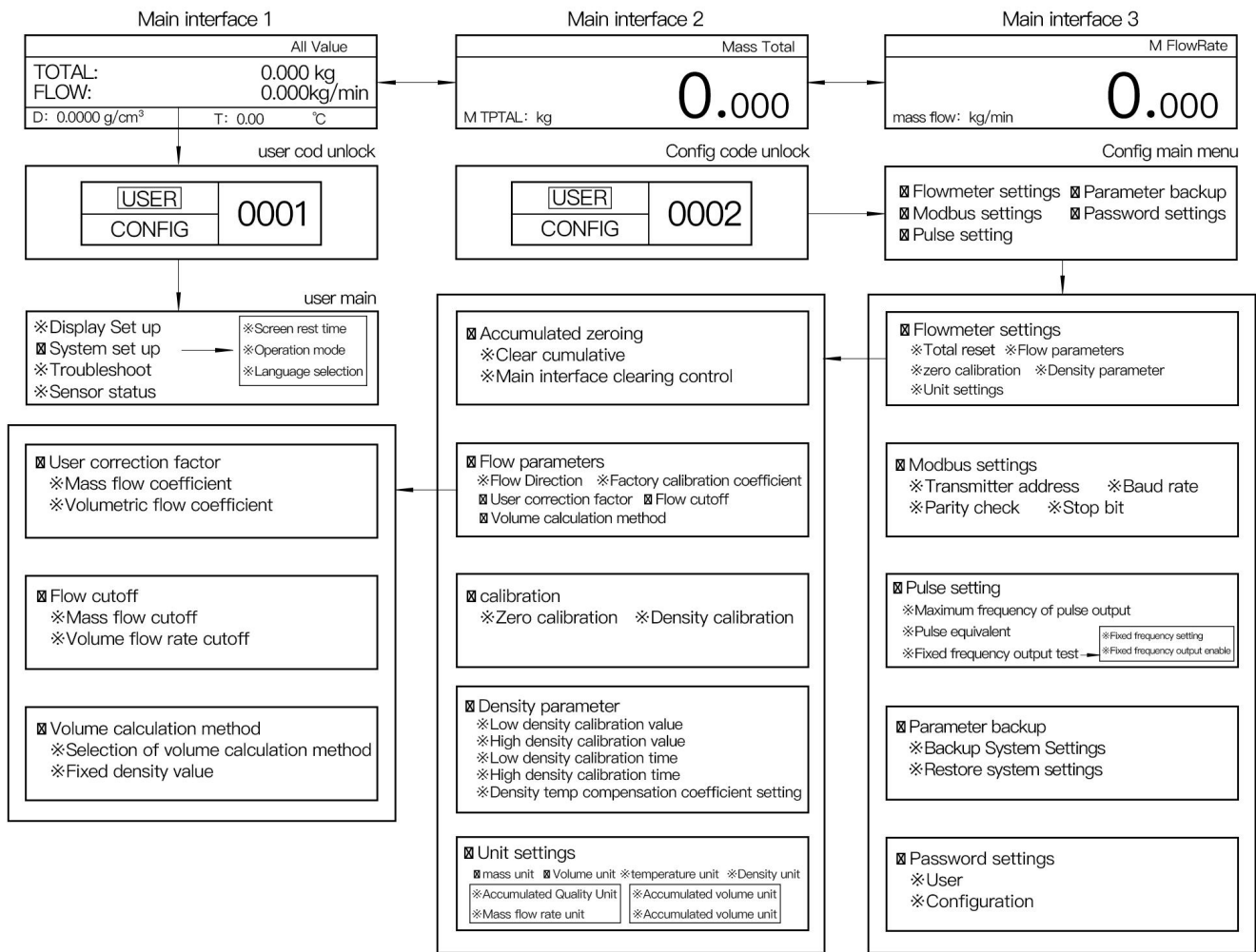


Figure 5-2 Overall system page

5.3 Interface Introduction

The main interface is divided into three interfaces, as shown in the following table:

Figure 5-3 Home screen Table

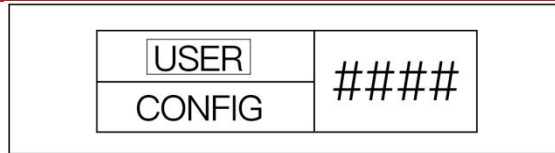
Main interface1	Main interface2	Main interface3
<p>Content identification Display measurement values</p> <p>All Value</p> <p>M TOTAL: 0.000 kg M FLOW: 0.000 kg/min</p> <p>D: 0.0000 g/cm³ T: 0.00 °C</p> <p>Real time density Density unit Real time temperature Temperature unit</p>	<p>Mass Total</p> <p>M Total: kg 0.000</p> <p>Mass unit Measurement values</p>	<p>M FlowRate</p> <p>mass flow: kg/min 0.000</p> <p>Flow velocity unit Measurement values</p>

The SET mass instantaneous flow and volume instantaneous flow display can be switched under the main interface.

You can switch between the displays on the SELECT screen on the home screen.

5.3.1 Password Setting Screen

(1) Interface diagram



(2) The page is displayed

On the home screen, hold down the SELECT key. The red indicator blinks for 3 seconds, and the password setting screen is displayed.

(3) Interface introduction

a. This interface is used for permission selection, password enter to set flowmeter parameters, the main interface permission selection is user and configuration (user password 0001, configuration password 0002, clear cumulative 0003).

b. Password initialization: the transmitter is powered off, then powered on, and when the version number appears on the display screen, press the small turtle button K1 key on the edge of the display module for 3 seconds to complete the initialization of the password.

5.3.2 Parameter Setting Interface

(1) Interface diagram

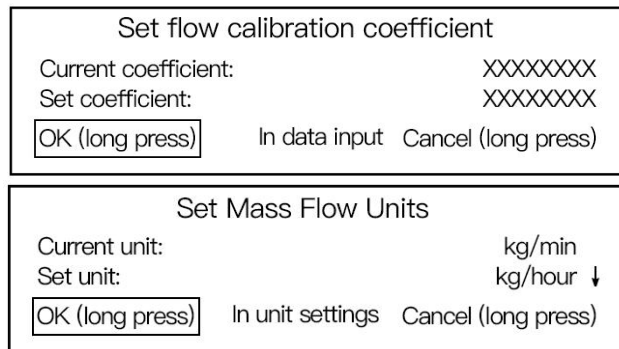


Figure 5-6 Unit setting page

(2) Introduction to interface operations

Set the value of the unit item to a blinking font. Press SELECT to SET the unit and move the unit from top to bottom until the unit setting is complete. Hold down set for 3 seconds. If there is any input error or you want to cancel, hold down SELECT for 3 seconds to cancel and return to the upper-level menu and re-enter.

Introduction of measurement unit:

Table 5-1 Units on the unit page

Total mass	g; kg; T; St; lt; lb
Volume total	m ³ ; L; ft ³ ; barrels; UKgal; USgal
Mass flow	lt/day; lt/hour; st/day; st/hour; st/min; lb/day; lb/hour; lb/min; lb/s; T/day; T/hour; T/min; kg/day; kg/hour; kg/min; kg/s; g/hour; g/min; Special
Volume flow	ft ³ /h; ft ³ /min; USgal/day; L/hour; UKgal/h; USgal/h; Bar/day; Bar/h; m ³ /hourm ³ /s; m ³ /min; Special
Temperature	°C; °F; K; R
Density	g/cm ³ ; st/yd ³ ; lb/in ³ ; g/L; kg/L; g/mL; lb/ft ³ ; lb/gal; kg/m ³

6. Configure the software

6.1 Language

The user can select the current language of the software as "English" or "Chinese" from the navigation bar < Language >.

6.2 Meter Cable Connection

The communication connection between the software and the meter is connected via USB to 485.

The USB to 485 converter is available.

Install the converter software driver.

Connect instrument A+ to converter A+ and B- to converter B-. Then connect the GND of the instrument to the GND of the converter;

Plug the converter into a USB port on your computer and the corresponding COM port will pop up in your computer's Explorer.

6.3 Software Overview

The list of options in the top row is hereinafter referred to as the navigation bar, the lower left corner is marked with the currently available serial port number, and the lower right corner is marked with the current software and meter link status.

6.4 Connecting a Meter through Software

Users can also call up this window through the navigation bar < Connect >\< Connect to Devices >.

6.5 Configuration Monitoring

After the startup of the configuration software, the configuration parameters of the instrument and software can be set through the < function item >\< configuration > navigation bar.

6.5.1 Configuring Traffic

Through the navigation bar < function >\< configuration >\< flow > to achieve the meter and software flow unit parameter setting.

6.5.2 Configuration Communication Settings

Through the navigation bar < function >\< configuration >\< RS-485 > to achieve the instrument and software communication parameters setting.

6.5.3 Configuration Density Settings

Through the navigation bar < function >\< configuration >\< density > realize the density parameter setting of instrument and software.

6.5.4 Configuration Temperature Settings

Through the navigation bar < function >\< configuration >\< temperature > realize the temperature parameter setting of instrument and software.

6.5.5 Configuring Frequency Settings

Through the navigation bar < function >\< configuration >\< frequency > realize the frequency parameter setting of instrument and software.

6.5.6 Current Ring Setting (4 to 20mA)

Through the navigation bar < function >\< configuration >\< current > to realize the current parameter setting of the instrument and software.

6.6 Monitoring process variables

Through the navigation bar < function item >\< process variable > call out the window; The window displays the main real-time parameters of the flowmeter.

6.7 Accumulator Controller

Through the navigation bar < function >\< Accumulator controller > call out; The content of the window shows the real-time accumulated value of the instrument; When the user clicks the Reset Mass total burden button, the meter begins to perform the clear accumulation task.

6.8 Instrument Status

Use the navigation bar < function >\< status > to call it up. The content of the window displays the real-time instrument error status. When the corresponding item is displayed in red, it means that the item corresponding to the instrument has an error flag.

6.9 Instrument communication test

Use the navigation bar < Function >\< Communication Test > to bring up this window.

6.10 Fixed Frequency Output

Use the navigation bar < Function >\< Fixed Frequency Output > to bring up this window.

6.11 Mainboard Information

Use the navigation bar interface < function >\< motherboard information > to bring up this window. Read the motherboard version number of the meter and display the real-time operating temperature.

6.12 Mainboard Calibration

Motherboard calibration bar has a total of five options, here select the important and commonly

used two items to explain.

Density calibration window

Open the window through the navigation bar < Function >\< calibration >\< Density calibration 1>. The relevant factory sensitive parameters are engraved on the instrument nameplate. Used to recover accidental loss of instrument data.

zero calibration window:

Open the window through the navigation bar < function >\< calibration >\< zero calibration >. Click the "Zero Calibration" button to perform the zero calibration task. At the same time, the zero calibration window will be displayed in red during calibration, and the window will display relevant real-time calibration parameters.

7. Parameter Setting Operation description

If you are equipped with F100 transmitter, please refer to the PC software side directly.

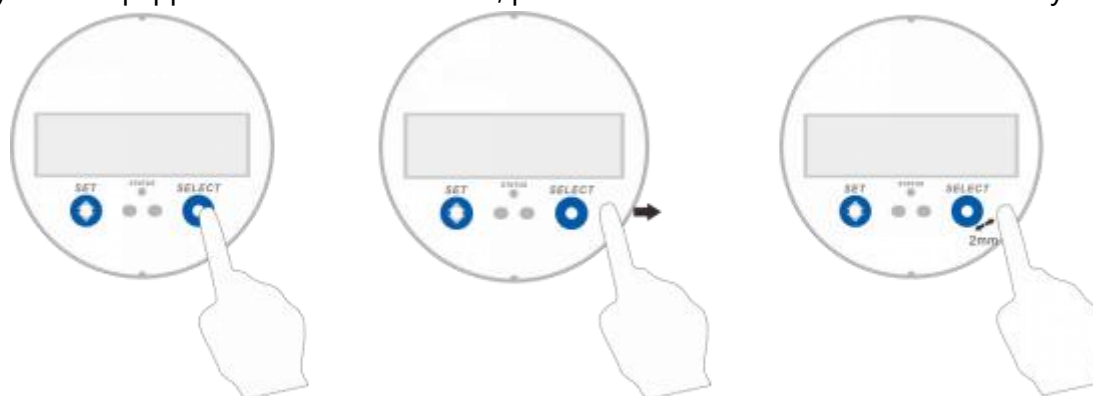


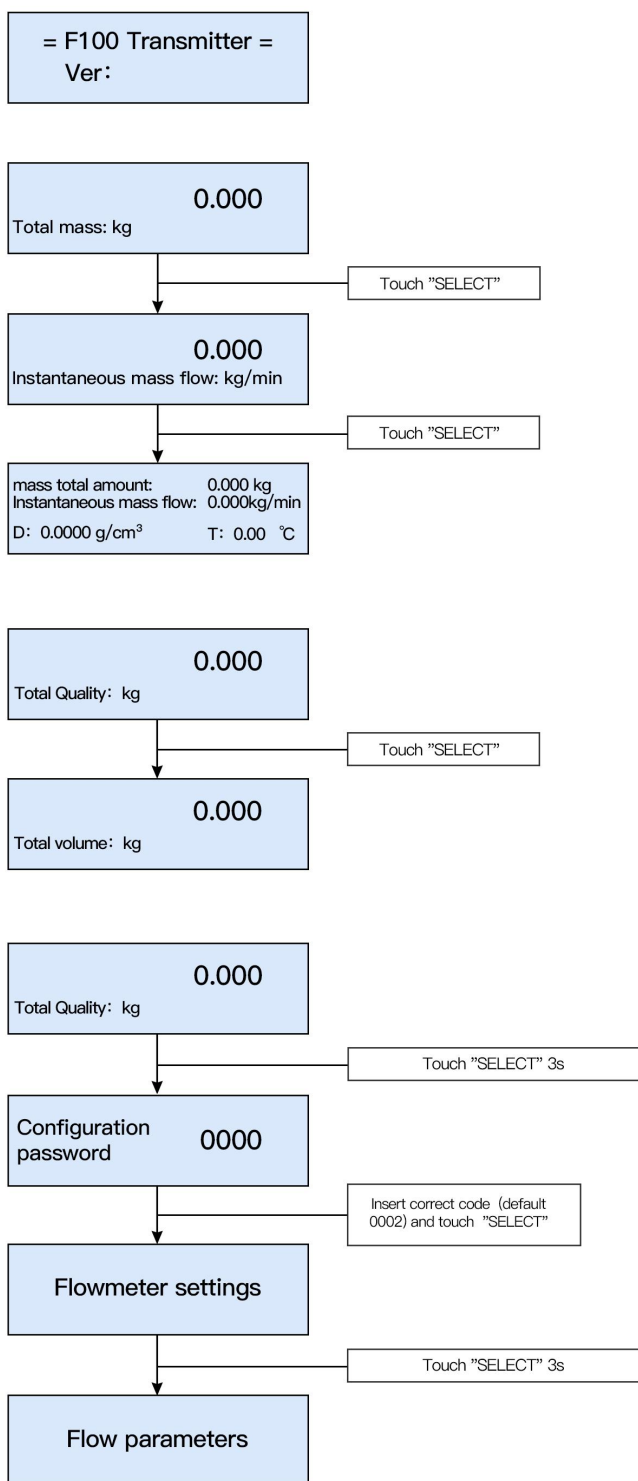
Figure 7-1 Schematic diagram of operations

To ensure the reliability and stability of action recognition, ensure that the operation is 1 to 2mm away from the glass panel (see Figure 7-1), and avoid unnecessary actions. Touch once, identify once. For example, do not touch SELECT when identifying the SET action.

Main interface	Press the SET key to switch between mass and volume
	Press the SELECT key to switch between instantaneous traffic and total volume
	Hold down the SELECT key to display the system password screen
Menu, parameter and value selection	Press the SELECT key to select the desired setting menu, parameters, and values
	Press the SET key to access the selected menu/Determine parameters or values
Parameter Settings save	Hold down the SET key to save the parameter Settings
Press and hold the SELECT key to exit or return to the upper level	

Table 7-1 Key operations

Specific operation:



Power on:

The LCD screen displays LOGE and version number, and the system performs internal self check and initialization

Query:

The homepage display interface defaults to displaying the total quality, pressing the "SELECT" button to turn pages and search for instantaneous flow rate, temperature, and density.

Query:

The default display interface on the homepage displays the total quantity of quality. Press the "SET" button to turn the page and query the total volume.

Change value:

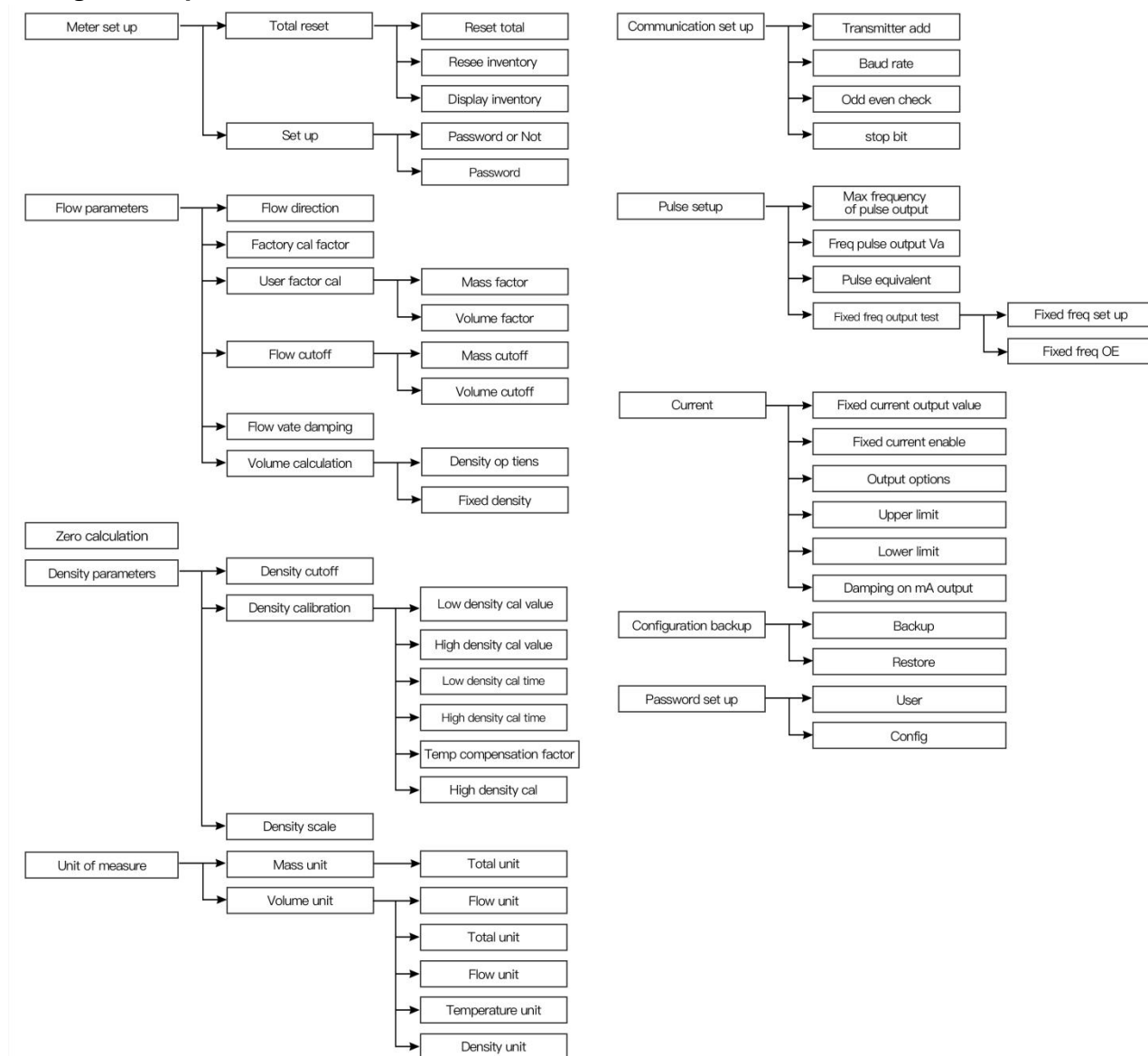
After short pressing SET to confirm the permission, the value will automatically pop up;

Short press SELECT to select the desired value;

Short press SELECT to select the desired value; After short pressing SET to confirm the number of digits, it will automatically jump to the next numerical value;

After entering, press SET for 3 seconds, and the button indicator light will start flashing. At this point, leave the button.

Configuration parameters menu:



Key operation instruction

Green: (microcomputer working status light) The microcomputer light is enabled in the screen state.

Red light: (operation indicator) Key operation indication.

Short button: The red indicator light is on. When the indicator light is on, it is quickly away from the touch area.

Long button: red light flashes, long press for 3 seconds and quickly away from the touch area.

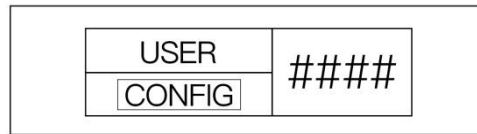
Note:

(1) When pressing the button, press it as quickly as possible, and wait for the red indicator light to be quickly away from the touch area before pressing the button again;

(2) If there is no operation within five minutes, the screen will automatically break;

(3) Decimal point setting: When the current input value is zero, the decimal point is automatically set; If the input units value is not zero, the decimal point is displayed in the number loop.

7.1 System Password page



On the home screen, hold down the SELECT key. The red indicator blinks for 3 seconds, and the password setting screen is displayed.

As shown in the figure, press SELECT to select the required permissions; After you press SET to confirm the permission, the value will be displayed automatically. Press SELECT to select the desired value. When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, and the key indicator starts to blink. At this time, leave the key.

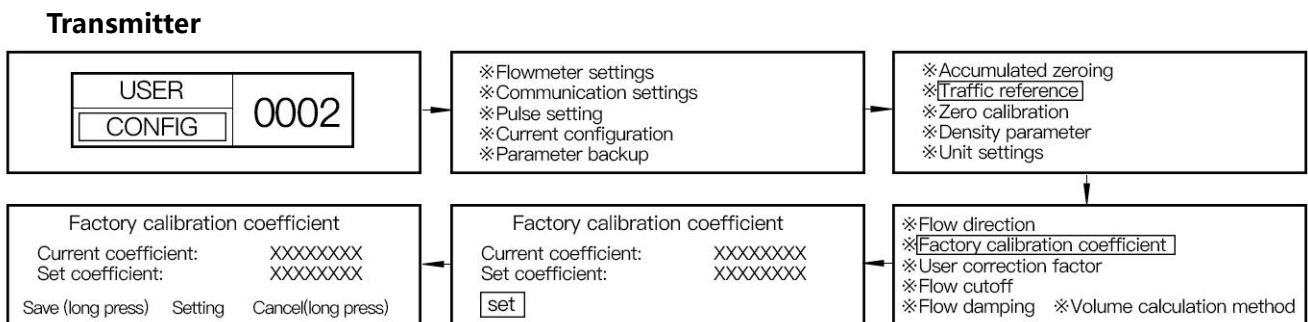
7.2 Configuration Permission Select a setting item

The configuration items include the following sub-menus: 1. Flowmeter Settings 2. Communication Settings 3. Pulse Settings 4. Parameter backup 5. Password Settings

7.2.1 Setting the calibration coefficient

Each mass flowmeter has its own calibration factor, which is set before the factory and marked on the calibration certificate and nameplate. Therefore, the user does not have to set the calibration factor separately, except that the sensor or transmitter needs to be replaced. All sensors and transmitters are paired one by one, and the calibration coefficients are entered into the transmitters before they leave the factory. Therefore, no additional changes are required to use the sensor. If the measurement results differ too much, please first determine the zero stability, such as zero stability, need to readjust the calibration coefficient. The calibration coefficient formula is as follows:

$$\text{New coefficient (factory calibration coefficient)} = \frac{\text{Original coefficient}}{1 + \left(\frac{\text{Flowmeter reading} - \text{True quality}}{\text{True quality}} * 100\% \right)}$$



As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks, and then leave the key.

Software terminal

After the configuration software is connected to the flow meter, open the configuration setting boundary through the navigation bar < Function item > < Configuration >

Click the button "Modify value" on the right of the column of calibration coefficient, and click "Apply" to complete the modification of the calibration coefficient of the flow meter.

The user can adjust the modified coefficient to the user correction coefficient (mass flow coefficient and volume flow coefficient).

Note: Examples of user calibration coefficient modification

1) Error value = (measured value - standard value)/standard value

2) When the flowmeter value is larger than the standard value: the user calibration coefficient is filled in the calculation result of (1- error value)

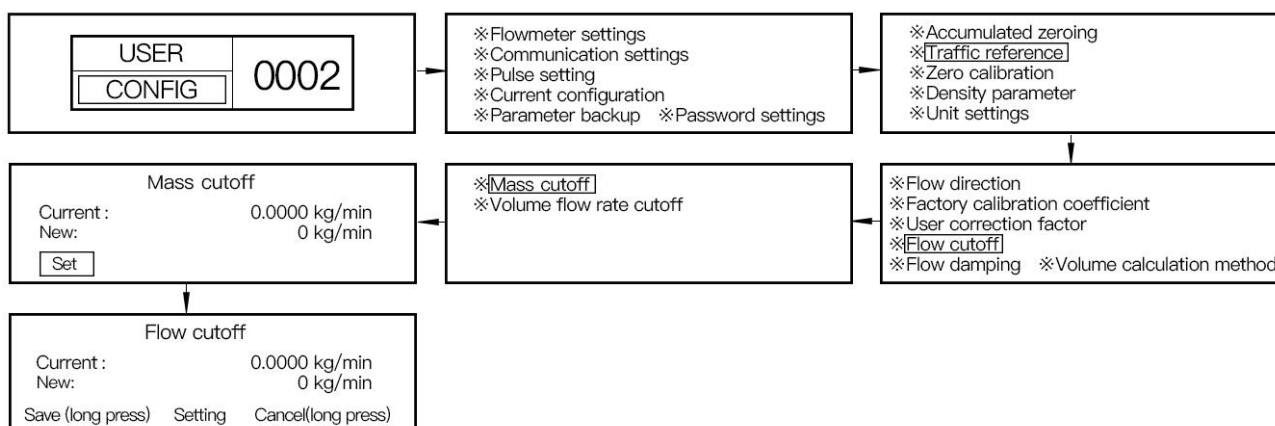
3) When the flowmeter value is smaller than the standard value: the user calibration coefficient is filled in the calculation result of (1+ error value)

7.2.2 Air density and water density calibration

Air density and water density calibration has been calibrated before the factory, non-professionals do not modify!

Software terminal

After the configuration software is connected to the flowmeter, go through the navigation bar < function item > < calibration > < density calibration >. During air density calibration, click the "Modify Value" button on the right of the column of air density and temperature coefficient calibration respectively, enter the corresponding D1 value and TC value on the sensor nameplate, click "Apply" and then click air density calibration to complete the calibration of air density constant; During the water density calibration, according to the actual temperature detected by the sensor in the process variable, search the temperature value corresponding to the "PT100 platinum resistance temperature resistance table" and input it into the water density value box, click the corresponding "Modify value" button on the right, and click "Apply" first after the modification.



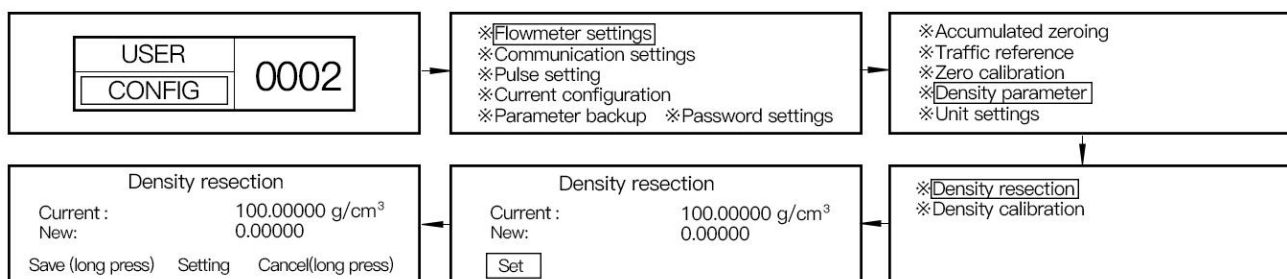
As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, and the key indicator starts to blink. At this time, leave the key.

Software terminal

After the configuration software is connected to the flowmeter, open the configuration setting interface through the navigation bar < Function >< Configuration > and click the "Modify value" button on the right of the mass flow resection. After the modification, click "Apply" to modify the mass resection parameter of the flowmeter.

7.2.4 Setting the density excision value

Transmitter



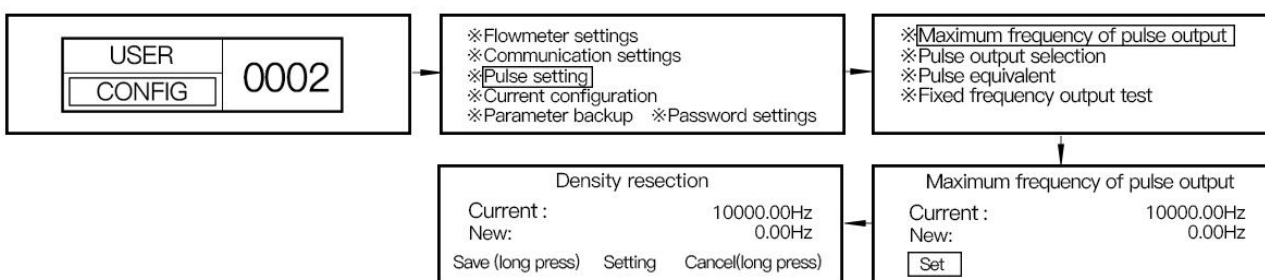
As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, and the key indicator starts to blink. At this time, leave the key.

Software terminal

After the configuration software is connected to the flowmeter, open the configuration setting interface through the navigation bar < Function >< Configuration > and click the "Low density excise" button in the density column. After the modification, click "Apply" to complete the modification of the low density excise of the flowmeter.

7.2.5 Setting the pulse Output Frequency

Transmitter



As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks, and then leave the key.

Software terminal

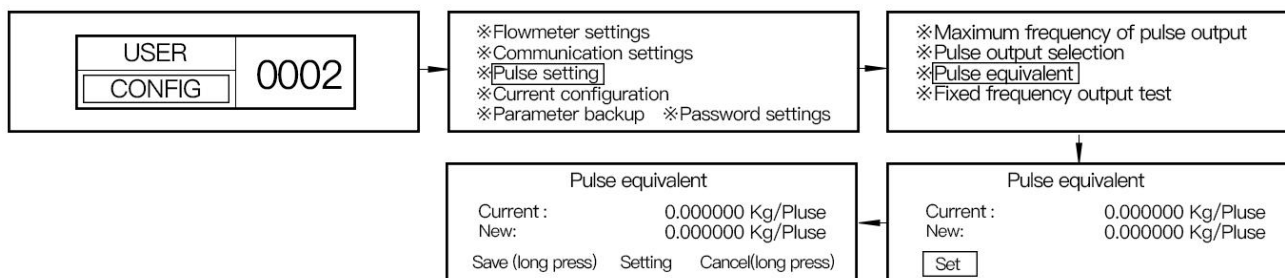
After the configuration software is connected to the flowmeter, open the configuration setting interface through the navigation bar < Function item >< Configuration >. Click the "Modify value" button on the right of the column of maximum pulse output frequency. After the modification, click "Apply" to modify the maximum pulse output frequency of the flowmeter.

7.2.6 Setting pulse equivalent

The flowmeter is equipped with default pulse values to meet most applications. Pulse When the magnitude value is set too small, the pulse receiver may experience pulse loss (small count), if the setting is too large, resulting in insufficient measurement resolution.

Setting principle, pulse equivalent = maximum working flow (kg/s) * 1.2 / maximum working frequency of the receiving counter.

Transmitter



As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks, and then leave the key.

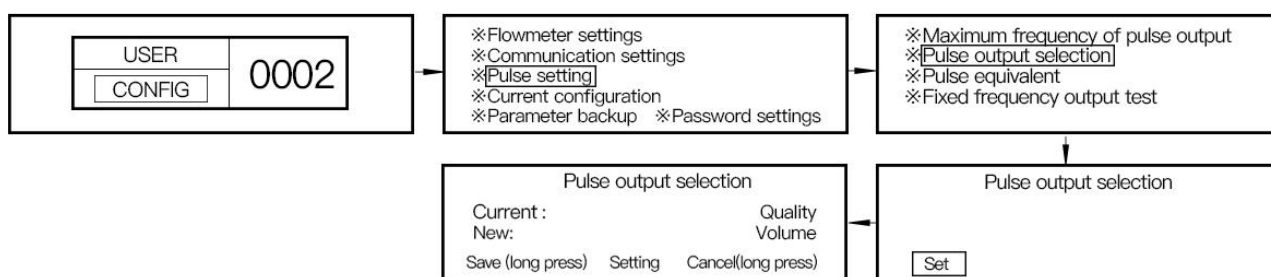
Software terminal

After the configuration software is connected to the flowmeter, open the configuration setting interface through the navigation bar < Function > < Configuration > and click the button "Modify value" on the right of the column of pulse equivalent. After the modification, click "Apply" to complete the modification of the pulse equivalent of the flowmeter.

7.2.7 Pulse output selection

The flowmeter is factory set with the default pulse output selected as mass. Pulse output selection can correspond to mass and volume.

Transmitter



As shown in the figure, press SELECT to select the required quality or volume; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

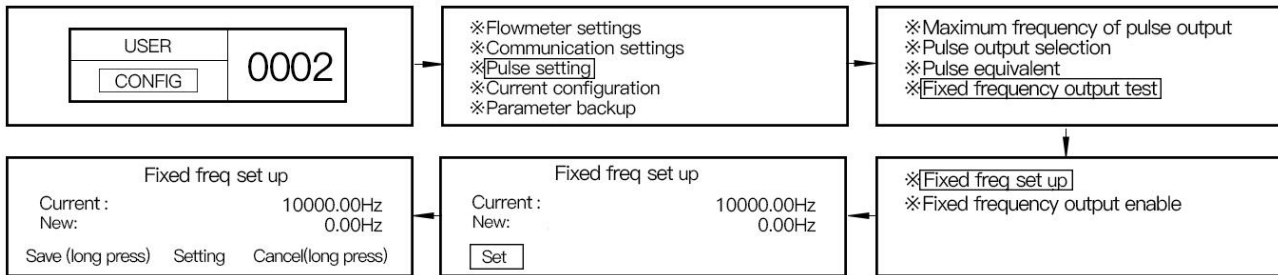
Software terminal

After the configuration software is connected to the flowmeter, open the configuration setting interface through the navigation bar < function item > < Configuration > and click the "Measurement Mode" button in the column of frequency. After the modification, click "Apply" to complete the pulse output selection.

7.2.8 Starting the fixed Frequency Output

This function simulates a fixed frequency output to assist in testing the pulse receiver's count accuracy and maximum receiving frequency. This output will automatically disappear in one minute.

Transmitter



As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks, and then leave the key.

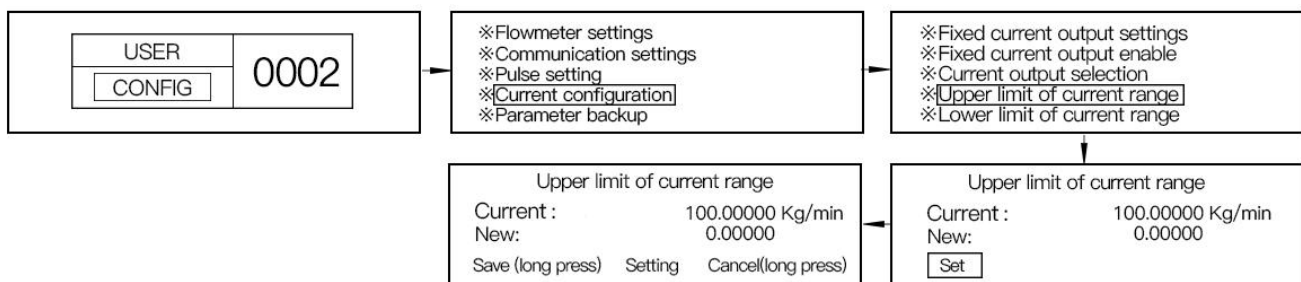
Software terminal

After the configuration software is connected to the flowmeter, open the zero point calibration interface through the navigation bar < function item >\< fixed frequency output > and click the "fixed frequency output" button, and the flowmeter starts to output a fixed frequency. Click "Cancel frequency output" to cancel the output of a fixed frequency. Users can also modify the flowmeter output frequency by clicking "Modify value".

7.2.9 Current Ring Setting (4~20mA)

This function sets the current ring (4~20mA), provides the flow value corresponding to the upper and lower current limits, and current output selection.

Transmitter



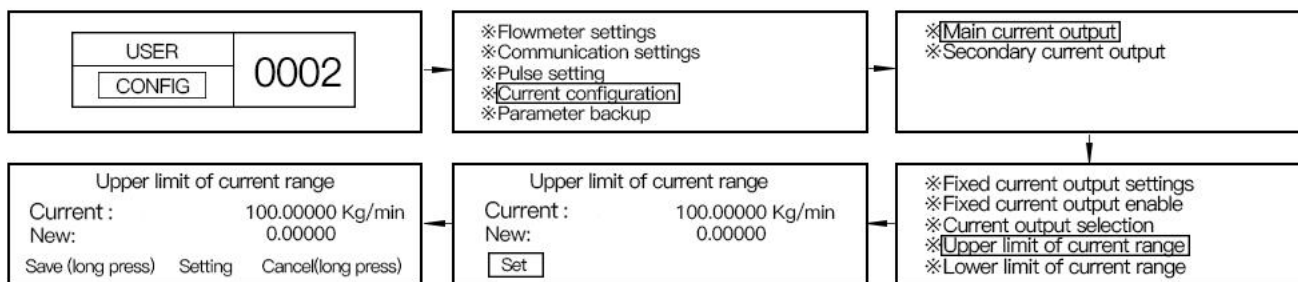
As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks, and then leave the key.

Software terminal

After the configuration software is connected to the flow meter, the current output configuration is displayed on the interface of < function item >\< configuration >\< current > in the navigation bar. Example: Select Mass and modify the corresponding upper current range and lower current range; After modification, click "Apply" to complete the current setting.

7.2.10 Setting Two Current Rings (4 to 20mA)

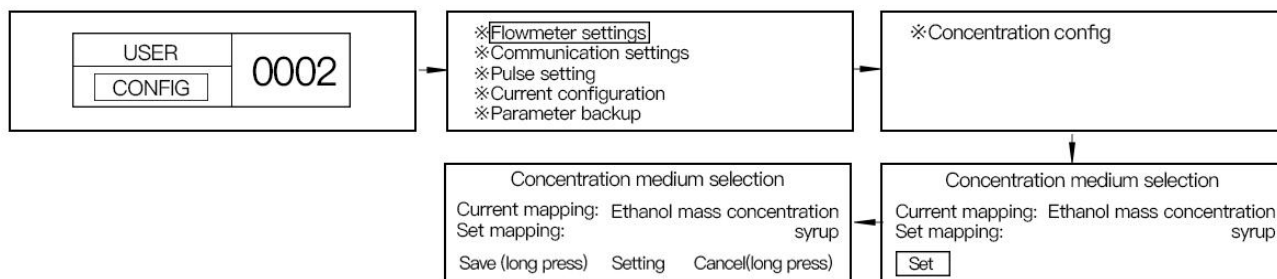
transmitter



As shown in the figure, press SELECT to select the required value; Press SET to determine the digit, press SET after input is complete, and hold down Set for 3s, the key indicator blinks, and then leave the key.

7.2.11 Setting the Concentration

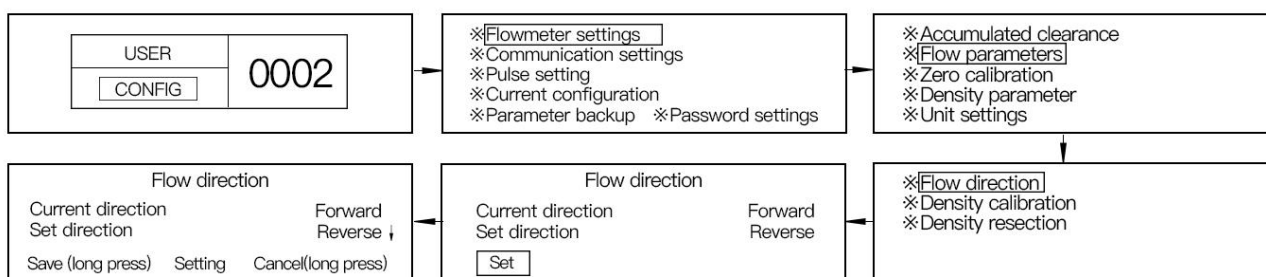
Transmitter



As shown in the figure, press SELECT to select the required medium concentration; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

7.2.12 Setting the Traffic Direction

transmitter



As shown in the picture, press SELECT to select the desired direction; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

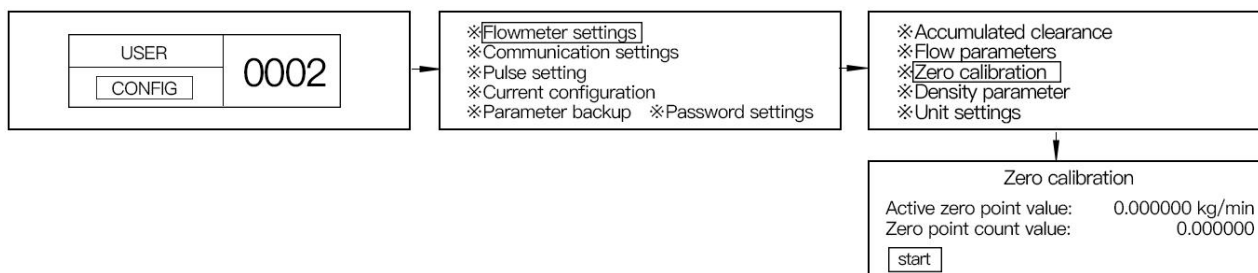
Software terminal

After the configuration software is connected to the flow meter, open the configuration setting interface through the navigation bar < Function > < Configuration > and click the "Flow direction" button in the column of flow. After the modification, click "Apply" to complete the modification of flow direction.

7.2.13 Starting zero calibration

See 4.2.5 for preparation of zero calibration

Transmitter



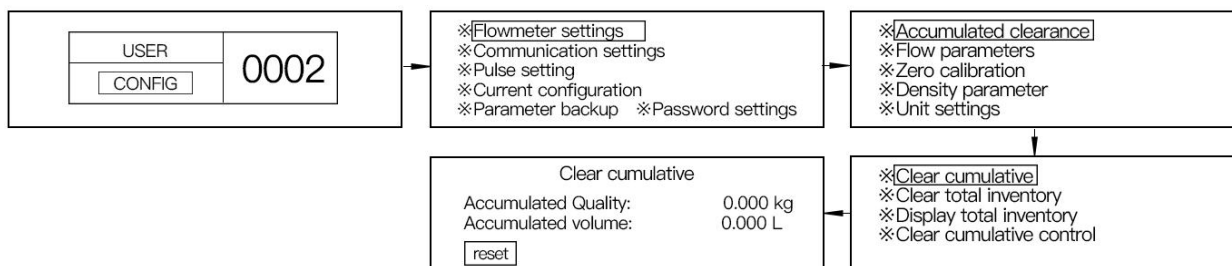
Press the figure as shown to enter the start screen: press SET, wait for the key indicator to light up, and then leave the key. At this time, the green microcomputer light flashes quickly.

Software terminal

After the configuration software is connected to the flow meter, open the zero calibration interface through the navigation bar < function item >\< calibration >\< zero calibration > and click the "zero calibration" button, and the flow meter starts to perform zero calibration.

7.2.14 Clearing the Flow meter Accumulation

Transmitter



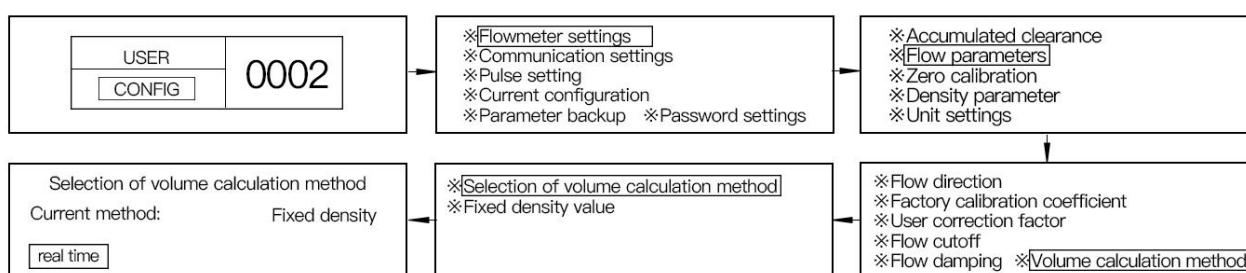
Enter the reset interface as shown in the figure: press SET, wait for the key indicator to light up, and then leave the key.

Software terminal

After the configuration software is connected to the flow meter, open the accumulation controller interface through the navigation bar < function item >\< Accumulation controller > and click "Reset mass total". The flow meter clears the accumulated flow.

7.2.15 Changing the volume calculation Mode

Transmitter

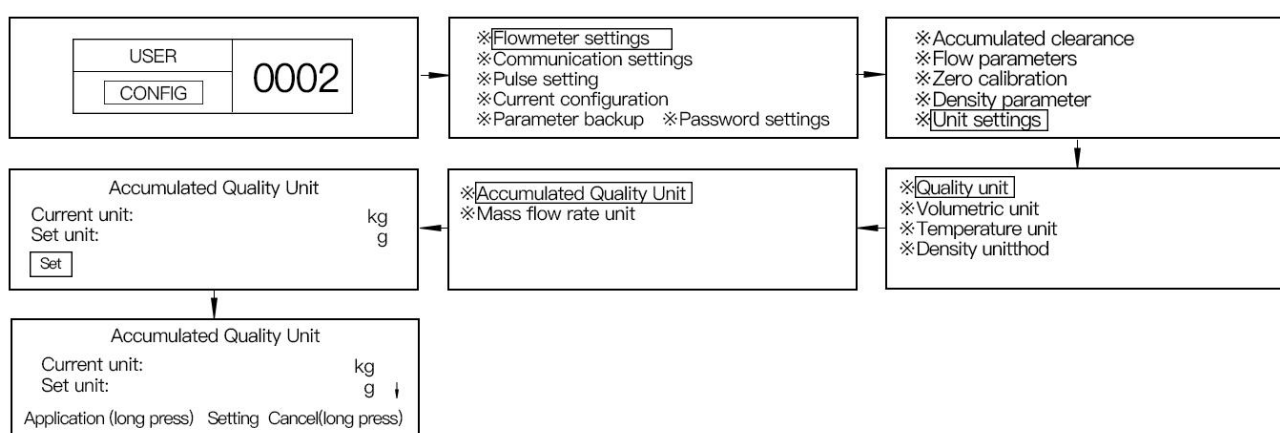


As shown in the figure, enter the fixed interface: press SET, wait for the key indicator to light up, and then leave the key.

Software terminal

After the configuration software is connected to the flow meter, open the volume calculation mode interface through the navigation bar < function item > \< Volume Measurement Mode >, and select based on standard density or based on real-time density through the option box. If the standard density is selected, the user needs to enter a fixed density value and click "Apply" to modify the fixed density value after modification.

7.2.16 Changing the Unit transmitter

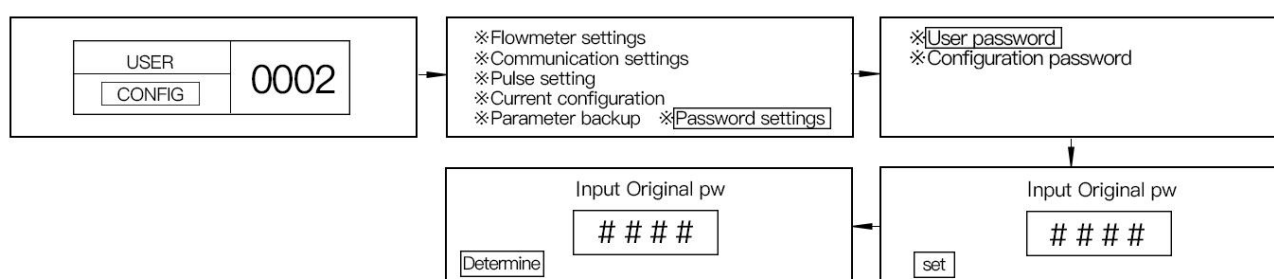


As shown in the figure, press SELECT to select the required unit; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

Software terminal

Through the navigation bar < function > \< configuration > \< flow > to achieve instrument and software unit parameter Settings.

7.2.17 Changing the System Password Transmitter

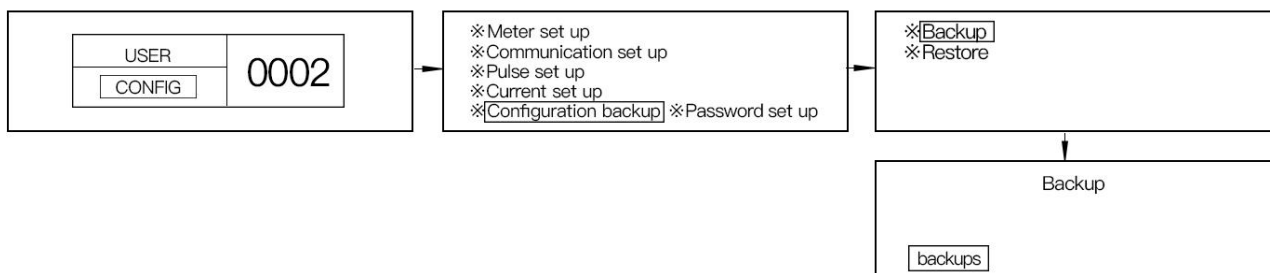


As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, the key indicator blinks on, and then leave the key.

7.2.18 Parameter Backup and Restoration

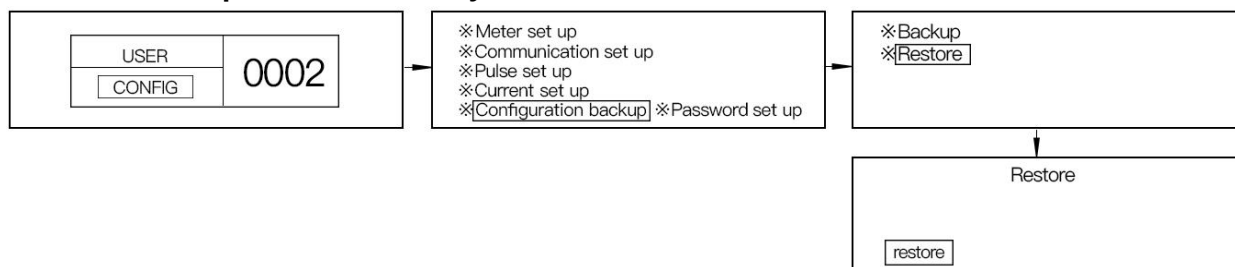
The product has been backed up factory Settings, the user according to the commissioning conditions set parameters, it is recommended to backup parameter Settings.

Transmitter parameter backup



As shown in the picture, enter the backup interface: press SET, wait for the key indicator to light up, and then leave the key.

Transmitter parameter recovery

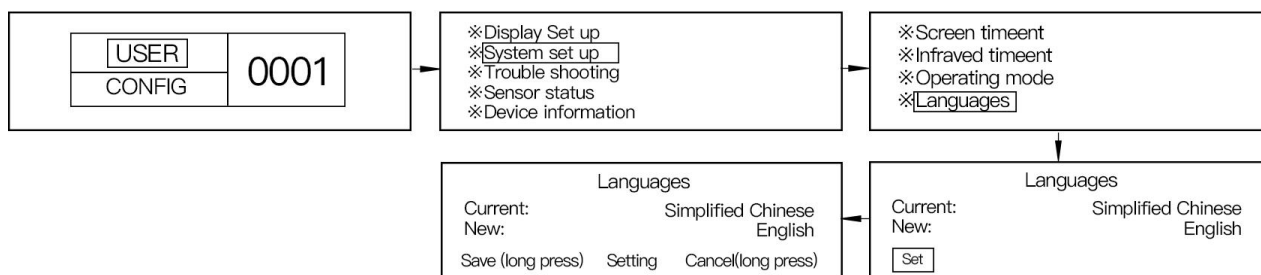


Press the picture as shown to enter the recovery interface: press SET, wait for the key indicator to light up, and then leave the key.

7.3 Selecting User Rights Settings

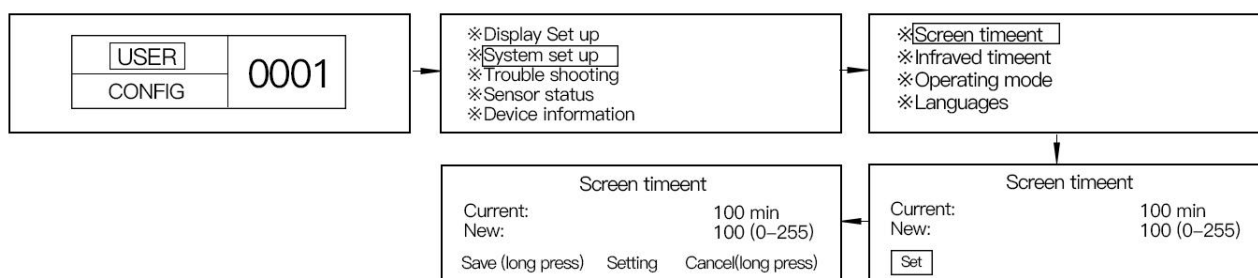
The user items include the following sub-menus: 1. Display Settings 2. System Settings 3. Fault Prompt 4. Sensor status

7.3.1 Language Selection



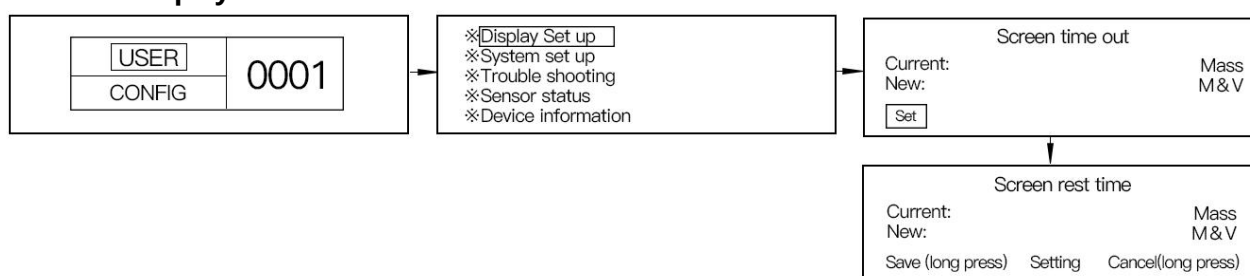
As shown in the picture, press SELECT to select the required language; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

7.3.2 Screen time



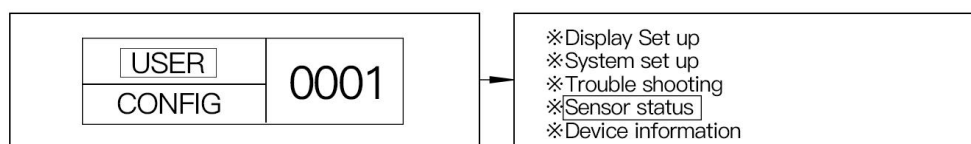
As shown in the figure, press SELECT to select the required value; When you press SET to determine the digit, it will automatically skip to the next digit. After input is complete, press and hold SET for 3s, and the key indicator starts to blink. At this time, leave the key.

7.3.3 Display Mode Selection



Press SELECT as shown in the figure to select the required display form; If yes, press SET. For 3s, the key indicator starts to blink. Leave the key at this time.

7.3.4 Checking Sensor Status



Enter the sensor status item as shown in the figure and press SELECT to view it. Press SET to return.

Shortcut key: On the home screen, press SELECT+SET for 3s at the same time, and the key indicator starts to blink. Then leave the key.

View: K1(Low density calibration time);

K2(high density calibration time);

D1(low density calibration value);

D2(high density calibration value) and factory calibration factor are consistent with the nameplate.

8. Explosion-proof

The explosion-proof performance of the mass flowmeter is manufactured according to GB3836.1-2010 and GB3836.4-2010 standards.

This mass flowmeter can be installed in the Ex dbIIC T6Gb explosion-proof rating area. Figure 8-1 shows the explosion-proof system

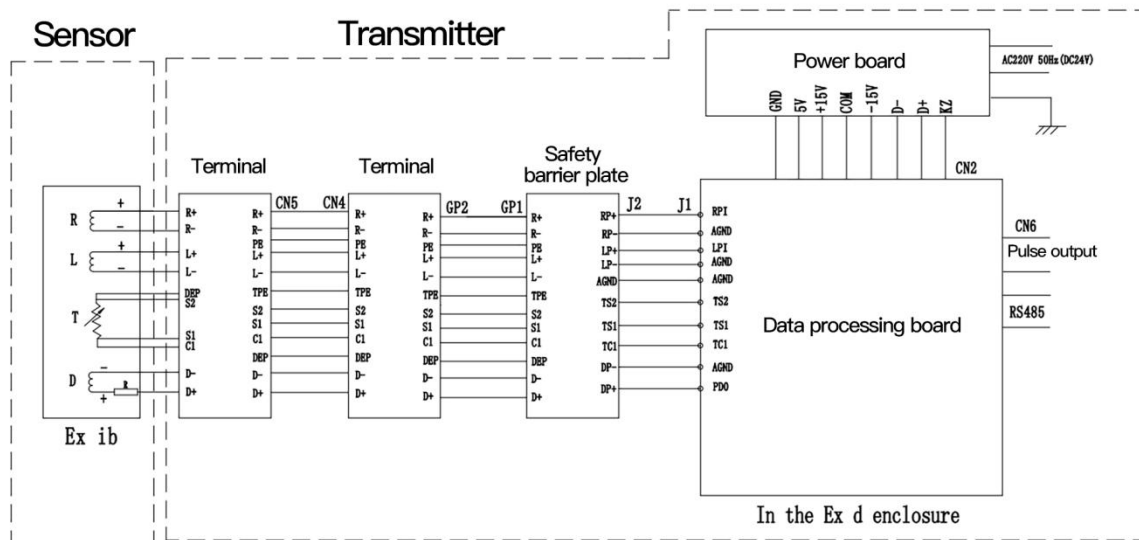


Figure 8-1 explosion-proof system diagram

8.1 Installation must be carried out by qualified electricians with experience in the installation of explosion-proof equipment.

8.2 Installation must meet the requirements of EN/IEC 60079-14: Latest version.

8.3 Preliminary and periodic inspections are required in accordance with the requirements of EN /IEC 60079-17: latest version.

During installation and operation mass flow timing, the grounding end should be well grounded; The user shall not disassemble and replace the electrical components and standard components in the sensor explosion-proof compartment without permission;

The cable shell can be selected as $\varnothing 8.5$ and $\varnothing 12$ according to the inner diameter of the cable shell ring. The outer diameter should be between $\varnothing 8 \sim \varnothing 8.5$ and $\varnothing 8.5 \sim \varnothing 12$. If the cable shell is aging or falls off, replace the cable shell in time.

Ensure that no corrosive gases corrode the aluminum alloy shell;

Ensure that disassembly operations are carried out in a safe environment away from flammable gases.

Maintenance of flameproof joints can only be carried out by or on behalf of the manufacturer and is the responsibility of the manufacturer itself. Repairs that do not comply with EN/IEC 60079-1 will not be accepted. All relevant safety terms and regulations shall be observed.

Check the following before the flowmeter is put into operation:

- Whether the flow meter is damaged during transportation and installation;
- Whether the power supply voltage used is consistent with the nameplate;
- Use the correct current value of the fuse;
- The instrument is properly grounded.

After the inspection, open the pipeline valve to fill the system with liquid, and pay attention to the removal of leakage and residual gas in the system. Turn on the instrument power supply, the general flow meter can work normally after 20 minutes of power preheating.

9. Troubleshooting

Before performing maintenance, read the relevant safety terms; When it is confirmed that the sensor is faulty, you can contact our company.

9.1 Self-Diagnosis

Both the upper computer software and the transmitter have the function of self-diagnosis when they restart. The diagnosis items include storage error, sensor error, temperature sensor overrun, zero correction failure, flowmeter initialization and other errors.

9.2 Determination of sensor coil resistance

When detecting the fault of the flow meter, check whether the resistance value of the sensor coil is normal according to Table 9-1

9-1 Resistance of the sensor coil

loop	Conductor color	Sensor interface	Normal resistance range
Left coil	Grey 、 purple	L-、 L+	(91 ~ 158) Ω
Right coil	Yellow 、 white	R-、 R+	(91 ~ 158) Ω
Driving coil	Red 、 blue	D-、 D+	(30 ~ 70) Ω
Temperature 1	Green 、 black	S1、 S2	(100 ~ 110) Ω
Temperature 2	Orange 、 black	C1、 TPE	(100 ~ 110) Ω

Note: The resistance values measured by the left coil and the right coil must be the same.

9.3 Power Supply and Cable Connections

9-2 Voltage of the power supply and cable connection

loop	Conductor color	Sensor interface	Normal voltage range
Output end of the power module			Direct current (5V, 15V, -15V)
Left detection voltage	Grey 、 purple	L-、 L+	Alternating current (0.12v ~ 0.25v)
Right detection voltage Driving voltage	Yellow 、 white	R-、 R+	Alternating current (0.12v ~ 0.25v)
loop	Red 、 blue	D-、 D+	Alternating current (0.60v ~ 3.0v)

9.4 Troubleshooting

9-3 Troubleshooting table

troubleshooting table	
Out of order	troubleshooting
Instrument no display	Is it in automatic screen state? Is the supply voltage between terminal L/+ and N/- correct?
Cannot set key	Is the display bar securely connected to the CPU board? Are parameter keys available?
No Modbus communication	Is the display bar properly connected to the CPU board? Is the communication port cable connected correctly? Is it loose? Are the serial port communication Settings correct? Is parameter key status setting available?
Zero point instability	Is the pipe completely filled with fluid? Does the liquid contain bubbles? Is it properly grounded? Is the flow meter located near motors, transformers, or other electrical equipment? Is the installed detector not subjected to mechanical pressure? Is the junction box dustproof and moisture-proof?
The indication is inconsistent with the actual flow rate	Is zero set correctly? Are mass flow units and undercuts properly set? Is it properly grounded? Is there gas penetration in the liquid? Are the control measurements correct and reliable?
The indication does not agree with the actual density	Is the density unit set properly? Do you choose a fixed density? Is the pipe completely filled with liquid and free of bubbles? Is the temperature measured correctly? Is there corrosion or erosion? Is there any accumulation or blockage in the pipe?
The indicated temperature does not agree with the actual temperature	Is the electrical connection detected correctly? Is the PT100 platinum resistance tested correctly? Is the temperature value detected correct?
The output signal is inconsistent with the specified signal	Is the output signal set correctly? Is the output normal?
If the above problems can not be solved, please call 021-61042610 contact us, we will be happy to serve you!	

10. Supply package

The instrument kit includes sensors and transmitters. For the separation type flowmeter, the special cable connecting its sensor and transmitter, if the user has ordered the required quantity to our company, it will be supplied with the table according to the order quantity. If the user needs our company to provide matching flanges for installation, you can indicate it when ordering. The delivered documents include: installation instruction manual, product certificate, packing list.

11. Transport and storage

In order to prevent the instrument from being damaged during transit, please keep the packing condition as we shipped it before arriving at the installation site.

In the storage process, the storage site should meet the following conditions:

- a. Protect against rain and moisture;
- b. Small mechanical vibration, and avoid impact;
- c. Temperature range (-30 ~ +65)°C;
- d. Humidity below 80%, preferably around 50%;
- e. To store used sensors, the measured medium must be cleared first;
- f. Open storage, instrument performance may be affected



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