



principle characteristics

The FM110B explosion-proof gear flow sensor is equipped with a built-in double gear, which can calculate the volume of medium through the high-precision gear volume and measure the micro-fluid medium. It is a new type of positive displacement flow sensor, which is used to measure the liquid flow or instantaneous flow in the pipeline in a precise continuous or intermittent manner.

- multi-function signal output
- LCD LCD display
- high pressure (10~400bar)
- high and low temperature resistance (-30℃...140℃)
- can measure various viscous media
- high precision and repeatability
- range specific width (1:100)
- wide range of measurement
- strong anti-corrosion and anti-pollution ability (acid and alkali)

product application

FM110B explosion-proof gear flow sensor is widely used in various industries for the accurate measurement of low flow, suitable for media: additive fuels, water treatment flotation tanks, corrosion inhibitors, catalysts, emulsifiers, oils, oils, spices, adhesives, solvents, inks and pesticides and other parts of high viscosity media. Application industries include automobile, aviation, mining, electric power, chemical, pharmaceutical, food, paint, petroleum, environmental protection, printing and other industries. . Particularly suitable for heavy oil. Polyvinyl alcohol resin, etc. The flow measurement of high viscosity medium. (can measure the viscosity is as high as 10000 pa. S fluid) small volume, light weight, runtime vibration noise and stable operation. Can also be used to measure the diameter of small flow measurement. Pick up small flow, range than wide, suitable for use in measuring conform to the changes of fluid flow, measuring accuracy is not affected by pressure and flow change, stable performance and long service life, large flow capacity.

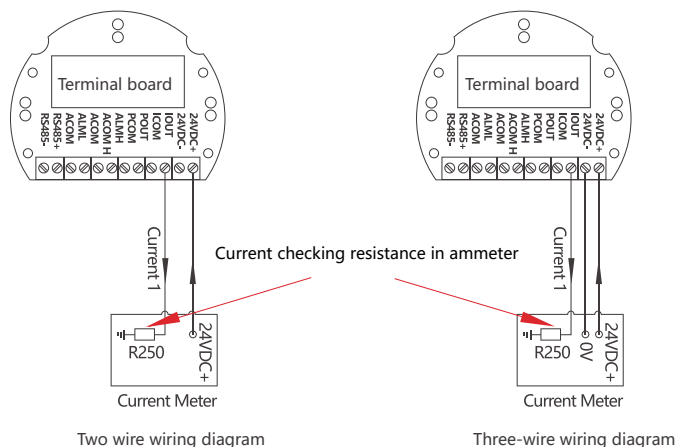
- Resin and glue measurement
- Measurement of hydraulic oil, lubricating oil and grease
- Fuel oil measurement
- Ink and asphalt measurement
- Measurement of liquid nitrogen, refrigerant and solvent
- Edible oil, fish oil
- Fluid measurement for chemical and anti-corrosion requirements

Technical parameter

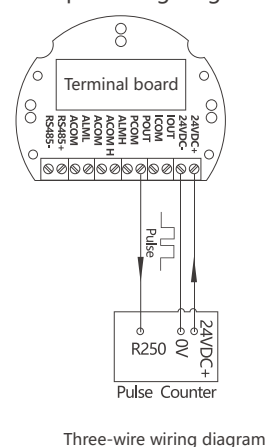
- ◇ Measuring range: See range table
- ◇ Output signal: 4-20mA, RS485, pulse, high and low alarm switch
- ◇ Measuring accuracy: 0.5%F.S
- ◇ Repeatability: 0.1%F.S
- ◇ Power supply: 16~30VDC
- ◇ Medium temperature: -30~120℃
(high temperature customization -50~140℃)
- ◇ Pressure resistance: Aluminum (40bar),
stainless steel (100bar/250bar/400bar),
PP (pressure 10bar)
- ◇ Material: Shell: aluminum, stainless steel, PP display: cast aluminum

wiring diagram

4-20mA Current output wiring diagram



Pulse output wiring diagram

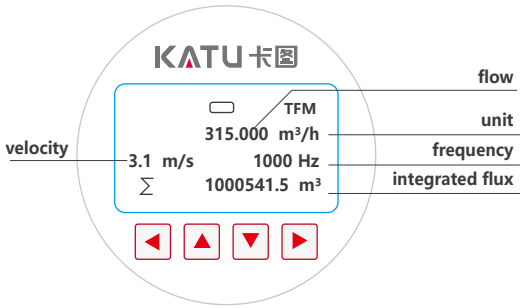
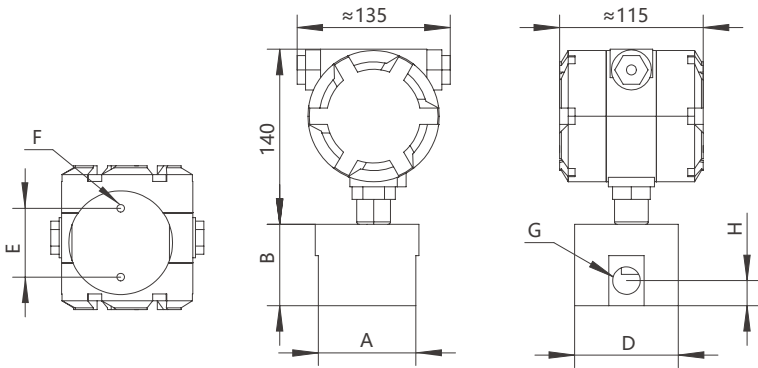


terminal

Terminal screen printing	function	note
24V +	DC 18 - 36V +	power supply 24V +
24-	DC 18~36v-	power supply 24V -
IOUT	4~20Ma+	Load charge <= -500 ohms
ICOM	4~20mA -	
POUT	Frequency & pulse output +	
PCOM	Frequency & pulse output common	
ALM H	High alarm +	It is recommended to use 24VDC intermediate relay with load current ≤ 30mA
ACOM	High alarm public end	
ALM L	Low alarm +	
ACOM	Low alarm public -	
RS+	RS485 +	RS485 terminal
RS-	RS485 -	

Size chart (mm)

Panel diagram



Model number	A	B	D	H	E	F	G	Measuring range
M 2	83	45	88	13	45	2*M 6	G 1/4	50-2000m L/m in
M 2S	83	43	88	10	44	2*M 5	G 1/4	5-2000m L/m in
M 4	80	55	83	16	55	2*M 6	G 3/8	0.1-4L/m in
M 6	80	62	83	14	55	2*M 6	G 1/2	0.15-8L/m in
M 10	80	65	83	14	55	2*M 6	G 1/2	0.5-20L/m in
M 15	110	65	113	28	90	2*M 6	G 3/4	2-50L/m in
M 25	124	70	138	29	100	2*M 8	G 1"	5-150L/m in

Selection table

FM110B-	M2	S	F	L	-	Instructions
FM110B-						FM110B explosion-proof high precision gear flowmeter
	M2					Measurement range: 50-2000mL/min
	M2S					Measurement range: 5-2000mL/min
	M4					Measurement range: 0.1-4L/min
	M6					Measurement range: 0.15-8L/min
	M10					Measurement range: 0.5-20L/min
	M15					Measurement range: 2-50L/min
	M25					Measurement range: 5-150L/min
		S				Output signal: Analog + pulse + RS485 communication + switch (no explosion-proof)
		E				Output signal: Analog + pulse + RS485 communication + switch (explosion-proof ExdIICT6)
			F			Sealing material: FKM (Standard type)
			P			Sealing material: PTFE polytetrafluoroethylene (anti-corrosion)
			G			Sealing material: silica gel (low temperature resistance -50°C)
				L		Body material: Alumina (pressure 40bar)
				S		Body material: 304SS (pressure 100bar)
				S1		Body material: 304SS (pressure 250bar)
				S2		Body material: 304SS (pressure 400bar)
				S3		Body material: 316SS (pressure 100bar)
				S4		Body material: 316SS (pressure 250bar)
				S5		Body material: 316SS (pressure 400bar)
				P		Body material: PP (pressure 10bar)
					-	Medium temperature: < 120°C
					T	Medium temperature: < 140°C Note: Aluminum /PP material does not support high temperature option

Flow calculation method

The K coefficient (flow coefficient) of FM110B explosion-proof gear flow sensor accurately defines the number of pulses per liter in unit flow.

$$Q = f \times 60 / K$$

Q= instantaneous flow liters per minute

F= output pulse frequency HZ

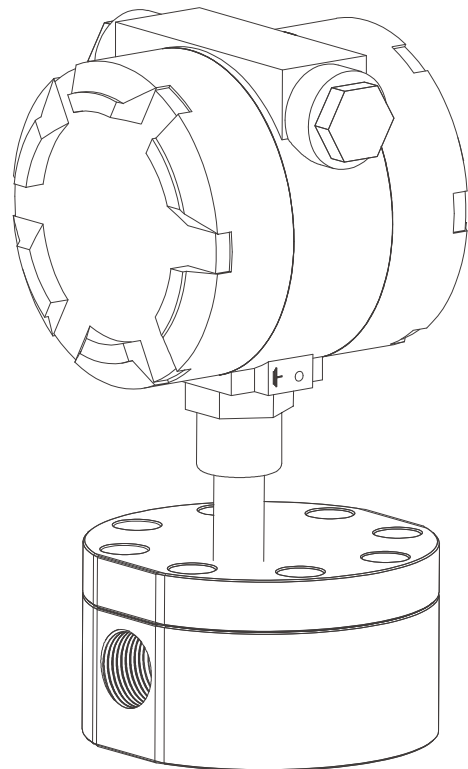
K= coefficient pulse per minute of gear flowmeter



Operating Instructions

Explosion-proof Gear Flow Sensor

FM110B



Safety Instructions

- Before installing this device, please read this document to ensure that the product is suitable for your application scope and is not subject to any restrictions.
- If the operation instructions or technical data are not followed, it may result in personal injury or property damage.
- In all application ranges, check whether the product material is compatible with the medium to be tested.
- The equipment is only used as the medium to be detected. It is necessary to ensure that the equipment is used correctly to operate stably for a long time and that the medium to be detected will not cause damage to the detection part of the product.

! The responsibility for determining whether the measurement sensor is suitable for the corresponding application lies with the operator. The manufacturer shall not be held responsible for any consequences caused by improper use by the operator. Improper installation and use of the sensor render claims invalid during the warranty period.

he flow sensor monitors the medium flow of the fluid

Precautions: Beware of personal injury and overpressure danger!

Product Overview

The FM110B explosion-proof gear flow sensor is equipped with dual gears running inside. It calculates the volume of the medium passing through with high-precision gear volume, achieving the measurement of micro-fluid media. It is a new type of volumetric flow sensor, used for precise continuous or intermittent measurement of the flow rate or instantaneous flow rate of liquids in pipelines.

Product features

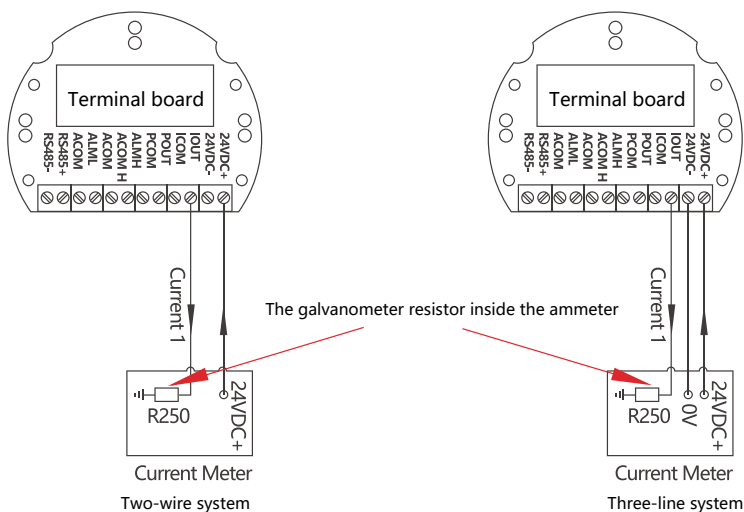
- Multi-functional signal output
- LCD liquid crystal display
- High pressure resistance (10 to 400bar)
- Resistant to high and low temperatures (-30°C...+150°C)
- It can measure various viscous media
- High precision and high repeatability
- Range ratio width (1:100)
- Wide measurement range
- Strong anti-corrosion and anti-fouling capabilities (acids and alkalis)

Product application

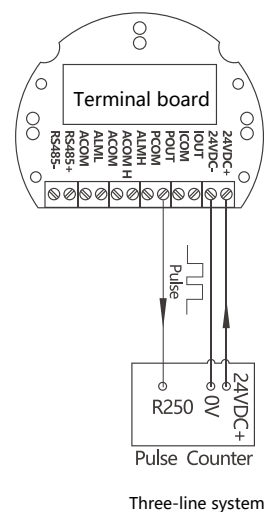
- Resin and glue measurement
- Measurement of hydraulic oil, lubricating oil and grease
- Fuel oil measurement
- Ink and asphalt measurement
- Measurement of liquid nitrogen, refrigerant and solvent
- Edible oil, fish oil
- Fluid measurement for chemical and anti-corrosion requirements

Electrical connection of explosion-proof joint

Wiring diagram for 4-20mA current output



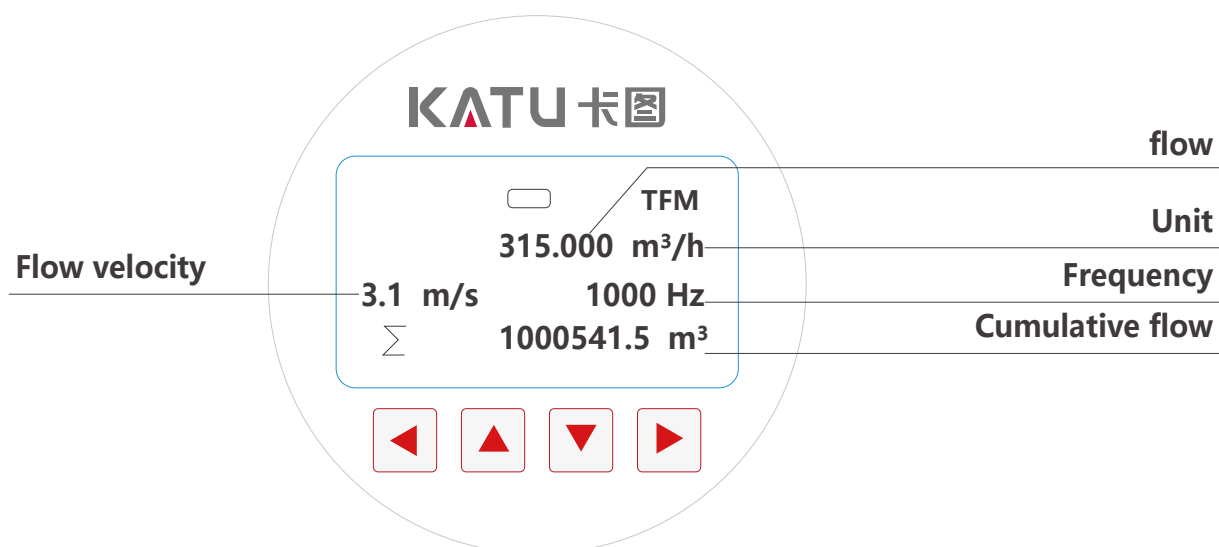
Pulse output wiring diagram



Definition of terminal blocks

Silk-screen printing of terminal blocks	Function	Remarks
24V+	DC 18-36V+	Power supply: 24V+
24-	DC 18~36v-	Power supply: 24V-
IOUT	4~20Ma+	The load current is less than or equal to -500 ohms
ICOM	4~20mA-	
POUT	Frequency & Pulse output +	
PCOM	Frequency & pulse output common terminal	
ALM H	High alarm	It is recommended to use a 24VDC intermediate relay with a load current of no more than 30mA
ACOM	High alarm public terminal	
ALM L	Low alarm	
ACOM	Low alarm public end -	
RS+	RS485+	RS485 terminal block
RS-	RS485-	

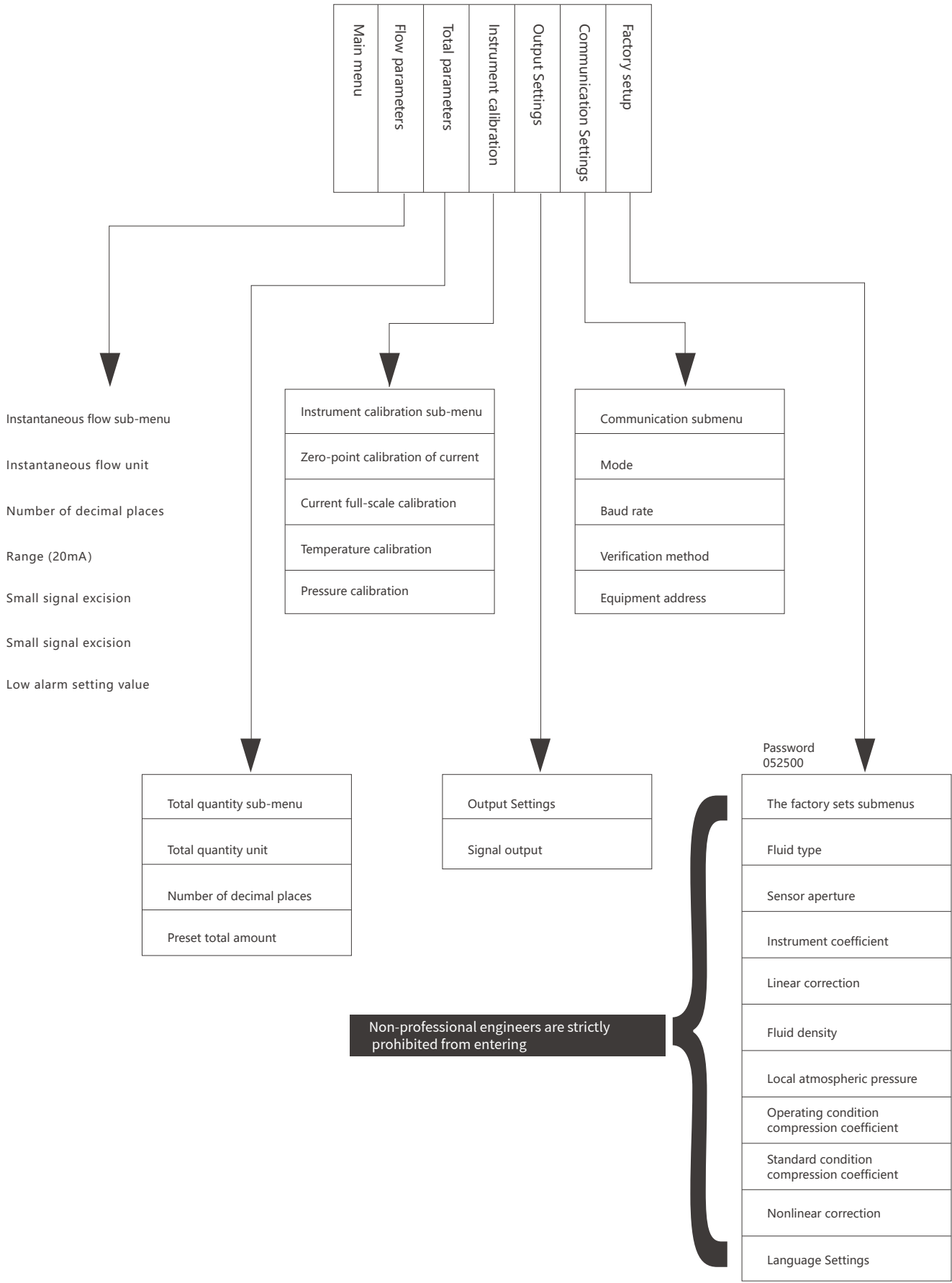
Panel schematic diagram



 Left shift, parameter setting confirmation key and exit subdirectory key;	 The factory is equipped with a fast key, a down key, and a number decrement key.
 Up shift, number decrement keys;	 Move right and enter the parameter Settings.

Adjustment method

Converter menu structure



Instantaneous flow parameter setting

Flow unit	Options: L/sL/mL/h m after m/s m after/m after the Nm/h after USG USG/m/s/h USG/hKg/sKg mKg/ht/st/mt/h
	Default value: m ³ /h
	Define the unit of instantaneous flow rate
	L(liters),h(hours),t(tons),s(seconds),m(minutes)
The number of decimal places of the flow rate	Option: 0123, default value: 1 defines the decimal places of the instantaneous flow rate
Range	Floating-point number: 99999999.00-0.00 m ³ /h, default value: 100.0 m ³ /h
	When the instantaneous flow rate reaches the range, the converter outputs 20mA. Changing this parameter will affect the current output, high alarm and low alarm, etc.
	Note: When you modify this set value (range), please pay attention to the unit of this parameter (range). You can modify the unit of this parameter (range) as needed.
Small signal excision	Floating-point number: 9.90-0.00%, default value: 0.0%. This set value is a percentage of the range
High alarm	Floating-point number: 99.00-1.00%, default value: 90.0%
	This setting value is a percentage of the range. For example, if this value is set to 10, it is equal to 10% of the range. If the absolute value of the instantaneous flow rate is greater than (range × 10%), the converter outputs a high alarm signal and the high alarm contact closes.
Low alarm	Floating-point number: 99.00 to 0.00%, default value: 0.0%
	This setting value is a percentage of the range. For example, if this value is set to 10, it is equal to 10% of the range. If the absolute value of the instantaneous flow rate is less than (range × 10%), the converter outputs a low alarm signal and the low alarm contact closes.
Damping time	Floating-point number: 30.0 to 0.1, default value: 1

Total quantity setting: Define the relevant parameters of the total quantity.

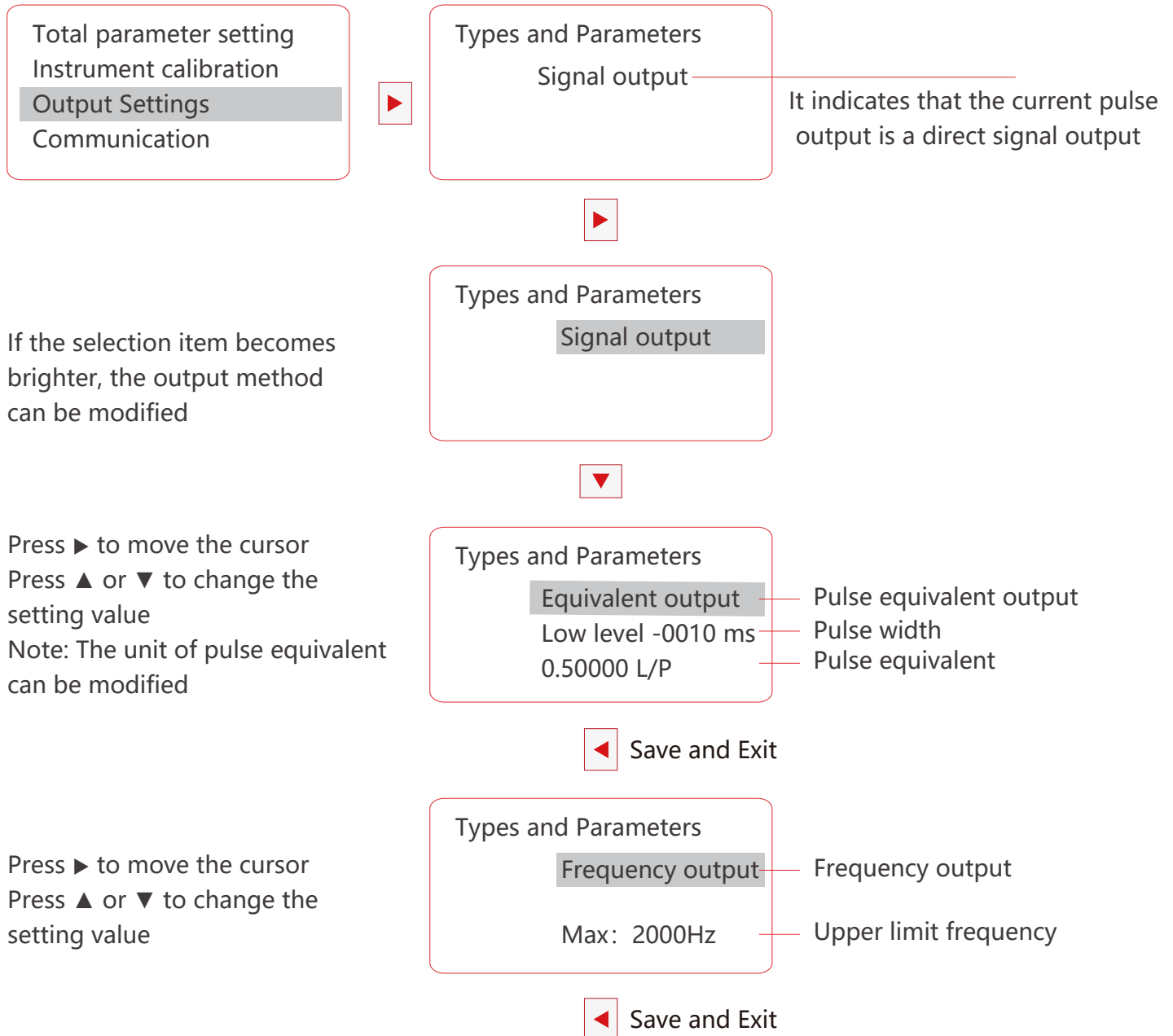
Total quantity unit	Options: L(liter)m ³ nm ³ USG Kg t(ton), default value: m ³ defines the total unit
The total amount is several decimal places	Option: 0123, default value: 1 define the decimal places of the total amount
Preset total amount	Option: 99999999.00-0.00 m ³ /h, default value: 0.0 m ³ /h. Clear the total amount or set the total amount value

Instrument calibration: Calibrate the current output and the temperature and pressure measurement circuits.

Zero-point calibration of current	Floating-point number: 5.0-3.0, default value: 0.0 After entering this sub-menu, use a multimeter to measure the current output value. If the current value is not equal to 4.0mA, input the true value measured by the multimeter, and the converter will automatically complete the calibration of the 4mA current output. Standard value. Note: If the current output deviation is too large, multiple corrections are required to recheck the requirements. The maximum input value for each correction is 5.0
Current full-scale calibration	Floating-point number: 21.0-19.0, default value: 0.0 After entering this sub-menu, use a multimeter to measure the current output value. If the current value is not equal to 20.0mA, input the true value measured by the multimeter, and the converter will automatically complete the 20mA current output calibration. Note: If the deviation of the current output is too large, multiple corrections are required to recheck the requirements, each time The maximum corrected input value is 21.0

Output Settings: Set the parameters for three output modes: equivalent output, frequency output, and signal output

Frequency upper limit	Floating-point number: 5000.0-100.0 Hz, default value: 2000.0 Output frequency (Hz)= Instantaneous flow rate (m³/h)÷ range (m³/h)× upper frequency limit (Hz) For instance, if the instantaneous flow rate is 100m³/h, the range is 200m³/h, and the upper limit of the frequency is set to 2000HZ, then the output frequency corresponding to the instantaneous flow rate of 100m³/h at this time is 1000 Hz
Pulse equivalent	Floating-point number: 9999.0-0.0, default value: 0.0 The unit of pulse equivalent is: L(liters)/ pulse. Users can change the unit of pulse equivalent as needed to: USG/P,Kg/P,t/P,Nm³/P,m³/P
Pulse width h(ms)	Floating-point number: 1000.0 to 0.0ns, default value: 0.0 When the pulse width is set to "0", the duty cycle of the pulse is 1:1
Signal output	Original signal output Note 1. It is merely a distinction between frequency output and equivalent output 2. Nonlinear correction also has an effect on the output of the original signal 3. It is related to the instrument coefficient K $F(HZ)=3600/(Q*K)$ Q: Instantaneous flow rate (m³/h); K: Instrument coefficient



Mode	Option: M odbus - R TU M odbus - ASCII Default value: M odbus-R TU
Baud rate	Option : 1 2 0 0 2 4 0 0 4 8 0 0 9 6 0 0 1 9 2 0 0 3 8 4 0 0 Default value: 19200 Note: Please set the Baut rate not to be lower than 96 0 0
Verification method	Options: No verification, even verification, odd verification Default value: Odd parity
Equipment address	Number value: 2, 4, 7 to 1, missing value: 1

How to set parameters

Press ► To enter the menu Settings, as shown in Figure 2:

In the interface shown in Figure 2, pressing ▼ or ▲ allows you to select different sub-menus. Press ◀ to return to the flow display interface, as shown in figure 1; Press ▼ or ▲ to select the sub-menu, and press ► to enter the sub-menu to set the parameters. For example: We need to set the "Instantaneous flow Parameter". When the sub-menu of the instantaneous flow parameter lights up, pressing ► will display as shown in Figure 3 below:

Press ▼ or ▲ to select the parameters you modify. The selected parameters will be highlighted. If you need to return to the menu shown in Figure 2, press ◀; If you need to enter the next-level menu, press ► to set the parameters, as shown in Figure 4:

In this case, press ▼ or ▲ to modify the parameters. For example, as shown in Figure 4, if you need to change the instantaneous flow unit "m³/h" to "m³/m", pressing ▲ will change the instantaneous flow unit to "m³/m", as shown in Figure 5

After modifying the parameters, if you need to save the Settings, press ◀ and the system will save them automatically.

As shown in Figure 6

In this case, press ◀, save the setting value and push out (as shown in figure 3).

315.000 m³/h
1.234 m/s
12.03 m³

Figure 1 Instantaneous flow display interface

Instantaneous flow rate
Total quantity setting
Instrument calibration
Output Settings
Communication Settings

Figure 2

Flow unit
The number of decimal places of the flow rate
Range
Small signal excision
High alarm

Figure 3

Flow unit
m³/h
m³/h

Figure 4

Flow unit
m³/h
m³/h

Figure 5

Flow unit
m³/h

Figure 6

RS485 communication address table

Variable name	Register starting address	Register length	Instruction code	Data types
Instantaneous flow rate	0x01	0x02	0x04	Floating-point number
Instantaneous flow unit	0x03	0x01	0x04	Integer type
Total amount	0x04	0x04	0x04	Double precision
Total quantity unit	0x08	0x01	0x04	Integer type
Temperature	0x09	0x02	0x04	Floating-point number
Pressure	0x0b	0x02	0x04	Floating-point number
Total amount (m ³)	0x0d	0x02	0x030x04	Floating-point number

Instantaneous flow rate	0x14	0x02	0x04	Floating-point number
Total amount	0x16	0x02	0x04	Floating-point number
Temperature	0x18	0x02	0x04	Floating-point number
Pressure	0x1a	0x02	0x04	Floating-point number

Instantaneous flow rate	0x1e	0x02	0x04	float inverse
Total amount	0x20	0x02	0x04	float inverse
Temperature	0x22	0x02	0x04	float inverse
Pressure	0x24	0x02	0x04	float inverse

Unit definition

	Unit	Code	Unit	Code
Instantaneous flow rate	Nm ³ /h	0x00	usg/h	0x09
	Nm ³ /m	0x01	usg/m	0x0a
	Nm ³ /s	0x02	usg/s	0x0b
	m ³ /h	0x03	kg/h	0x0c
	m ³ /m	0x04	kg/m	0x0d
	m ³ /s	0x05	kg/s	0x0e
	L/h	0x06	t/h	0x0f
	L/m ³	0x07	t/m	0x10
	L/s	0x08	t/s	0x11
Total amount	Nm ³	0x00		
	m ³	0x01		
	L	0x02		
	usg	0x03		
	kg	0x04		
Temperature	t	0x05		

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