Product overview

According to Faraday's principle of electromagnetic induction, when a conductor passes vertically through magnetic field B, it will induce a voltage. U In the measurement of the flowmeter, the moving conductor is a flowing conductive medium, the magnetic field B is emitted from the direction perpendicular to the flowing medium, and the induced electro-motive force U on the two electrodes E1 and E2 is directly proportional to the flow rate V of the medium.

U=K×B×V×D
K- Meter constant
D- Internal probe spacing
After further processing, the induced electromotive force U is converted into a standard electrical signal output or display

Functional characteristics

- Compact design saves installation space
- Anti-corrosion sensor technology
- All electronic design without viscosity of moving parts
- Automatic temperature compensation
- Pulse output/analog output /RS485 communication optional
- Low pressure loss
- Strong anti-fouling ability

Technical parameter

◇ Measuring range: See range table	◇ Ambient temperature: -25... 85 ℃
◇ Suitable pipe diameter: DN4... DN25(see selection table)	◇ Medium temperature: -40... 120 No thermal shock
◇ Measuring medium: conductive liquid (conductivity >20uS/cm)	(optional high temperature 140℃)
◇ Accuracy: ≤±0.5% range	◇ Materials
◇ Repeatability: ≤±0.2% range	Electrode: stainless steel 316TI
◇ Pressure resistance: 16 bar	Process connection: stainless steel 316TI
◇ Supply voltage: 24±10%Vdc	Measuring tube: PEEK
◇ Current consumption: ≤80mA	Seal: EPDM
◇ Electrical protection: reverse polarity protection, short circuit protection	Housing: stainless steel 304
◇ Output	◇ Electrical connection: M12×1 connector
Pulse output: NPN output, pull-up resistor 2K	◇ Process connection: external thread/internal thread
Analog output: 4... 20mA, current limit 26mA, load resistance < 250Ω	/sanitary chuck can be selected
◇ Response time: < 100ms	

Wiring diagram

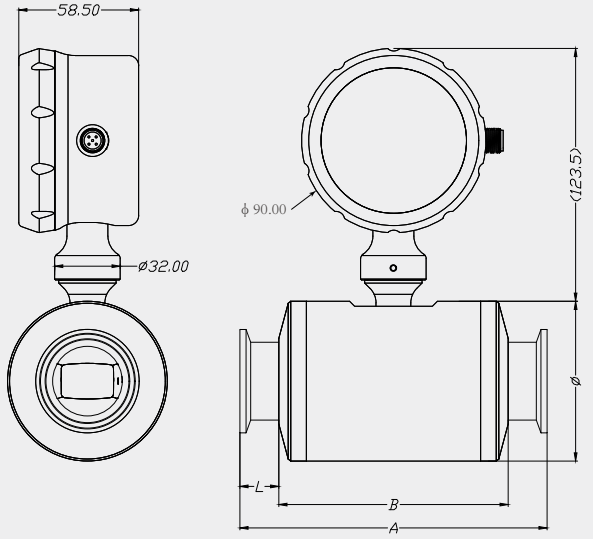
8-core wire

line	color	Feature
2	BN	power supply(+)
7	BU	power supply(-)
8	RD	RS485(A)
4	YE	RS485(B)
6	PK	pulse (+)
1	WH	pulse (-)
3	GN	electric current (-)
5	GY	electric current (+)

5-core wire

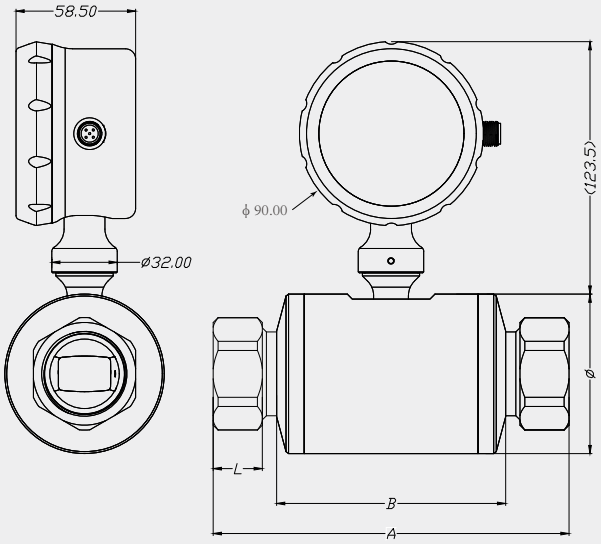
line	color	Feature
1	BN	power supply(+)
3	BU	power supply(-)
5	GY	Analog signal (mA)
2	WH	RS485 (A)
4	BK	RS485 (B)

Dimension drawing (mm)



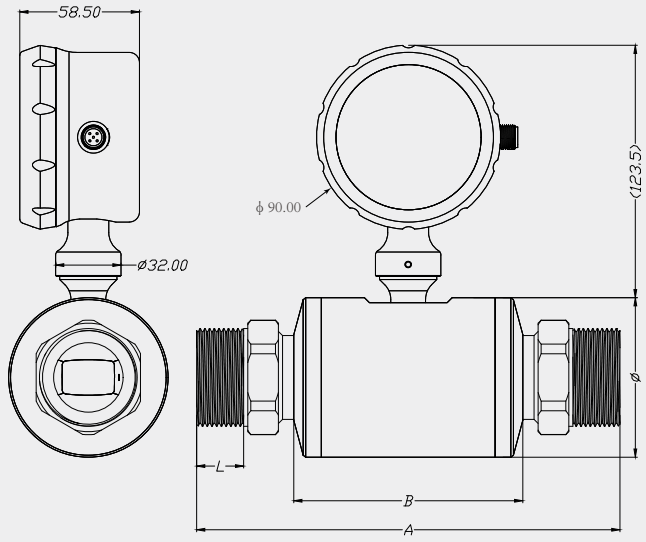
■ Chuck connection

Specification and model	Chuck connection	Pipe diameter (DN)	A	B	ϕ	Measuring range (L/min)
FM260-H04	25.4 Sanitary chuck	4	90	60	45	0.1-10
FM260-H08	25.4 Sanitary chuck	8	104	74	60	0.5-25
FM260-H12	50.5 Sanitary chuck	12	120	90	70	1-60
FM260-H15	50.5 Sanitary chuck	15	120	90	70	3-100
FM260-H25	50.5 Sanitary chuck	25	150	112	78	4-200
FM260-H32	50.5 Sanitary chuck	32	210	150	115	20-300



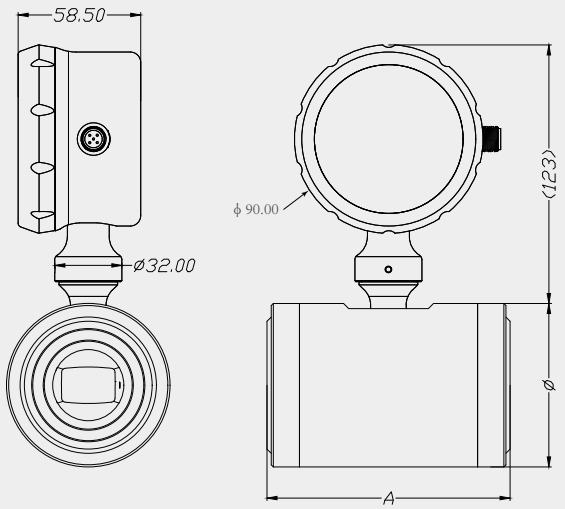
■ Internal thread connection

Specification and model	Internal thread connection	Pipe diameter (DN)	A	B	ϕ	Effective screw (L)	Measuring range (L/min)
FM260-GK04	Gl/4"	4	90	60	45	13	0.1-10
FM260-GK08	G1/2"	8	122	74	60	13	0.5-25
FM260-GK12	G3/4"	12	142	90	70	15	1-60
FM260-GK15	G3/4"	15	142	90	70	15	3-100
FM260-GK25	G1-1/4"	25	174	112	78	20	4-200



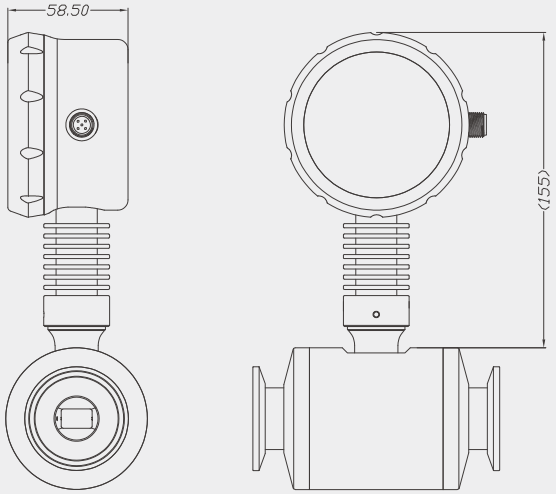
■ External thread connection

Specification and model	External thread connection	Pipe diameter (DN)	A	B	ϕ	Effective screw (L)	Measuring range (L/min)
FM260-GM04	Gl/4"	4	110	60	45	12	0.1-10
FM260-GM08	G1/2"	8	141	74	60	18	0.5-25
FM260-GM12	G1"	12	170	90	70	20	1-60
FM260-GM15	G1"	15	170	90	70	20	3-100
FM260-GM25	G1-1/2"	25	207	112	78	25	4-200



■ Tie rod flange connection

Specification and model	pull rod flange	Pipe diameter (DN)	A	ϕ	Measuring range (L/min)
FM260-F04	DN15	4	63	45	0.1-10
FM260-F08	DN25	8	80	60	0.5-25
FM260-F12	DN32	12	92	70	1-60
FM260-F15	DN32	15	92	70	3-100
FM260-F25	DN32	25	116	78	4-200



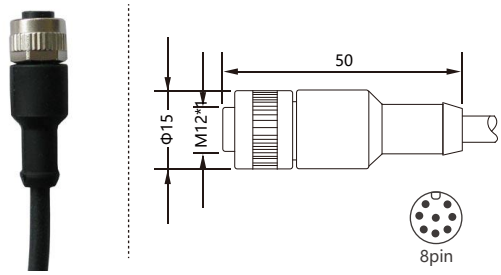
■ High temperature type (> 120°)

Selection list

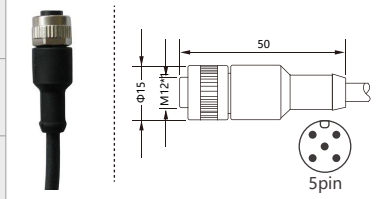
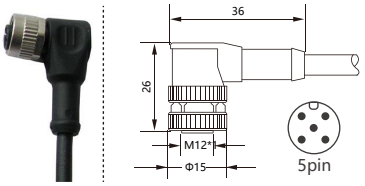
FM260-	H	04	PR	-	-	Instructions
FM260-						FM260 Electromagnetic flowmeter
	H					Process connection: Chuck connection
	GK					Process connection: G thread internal teeth
	GM					Process connection: G thread external teeth
	F					Process connection: pull rod flange
		04				Measurement Caliber: DN4
		08				Measurement Caliber: DN8
		12				Measurement Caliber: DN12
		15				Measurement Caliber: DN15
		25				Measurement Caliber: DN25
			PR			Output signal: Pulse/Current /RS485 (8 cores)
			RA			Output signal: RS485/analog mA (5 cores)
				-		Medium temperature: -20... 80 ℃
				H1		Medium temperature: -20... 140 ℃
				H2		Medium temperature: -40... 120 ℃
				H3		Medium temperature: -40... 140 ℃
					-	Sealing material: Silicone (-40...120℃ coolant)
					K	Sealing material: Perfluoroether
					E	Sealing material: EPDM
					F	Sealing material: Fluorine rubber (0...120℃)
					N	Sealing material: Nitrile rubber

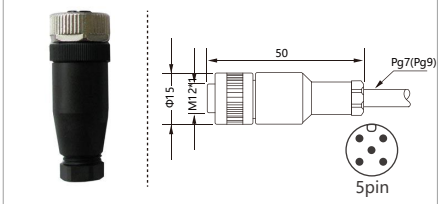
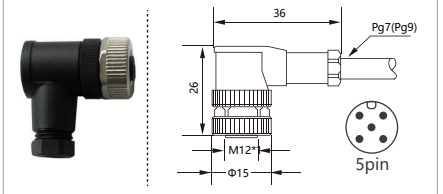
*Supports custom non-standard diameters

Optional accessories - Electrical accessories (M12*1-8Pin) :PR output signal wiring (Factory standard: ZL08-PC02G)

name	Outline drawing/dimension drawing (unit :mm)	material	Model number
M12*1-8Pin (2m cable)		PVC	ZL08-PC02G
M12*1-8Pin (5m cable)			ZL08-PC05G
M12*1-8Pin (10m cable)			ZL08-PC010G
M12*1-8Pin (2m cable)		PUR	ZL08-PU02G
M12*1-8Pin (5m cable)			ZL08-PU05G
M12*1-8Pin (10m cable)			ZL08-PU010G

Optional accessories - Electrical accessories (M12*1-5Pin) :RA output signal wiring (Factory standard: ZL05-PC02G)

name	Outline drawing/dimension drawing（mm）	material	model
M12*1-5Pin (2m cable)		PUR	ZL05-PU02G
M12*1-5Pin (5m cable)			ZL05-PU05G
M12*1-5Pin (10m cable)			ZL05-PU010G
		PVC	ZL05-PC02G
			ZL05-PC05G
			ZL05-PC010G
M12*1-5Pin (2m cable)		PUR	ZL05-PU02W
M12*1-5Pin (5m cable)			ZL05-PU05W
M12*1-5Pin (10m cable)			ZL05-PU010W
		PVC	ZL05-PC02W
			ZL05-PC05W
			ZL05-PC010W

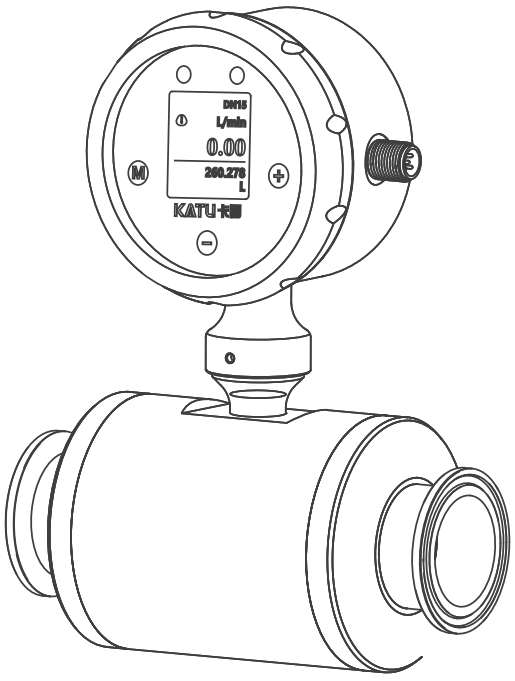
M12* 1-5Pin self-connector/size drawing（mm）	model
	GL05 (5Pin joint)
	WL05 (5Pin joint)

Sensor and controller

■ Flow ■ pressure ■ temperature ■ level ■ position

KATU 卡图

Operation instruction
Electromagnetic flowmeter
FM260 Series



Safety statement

- Before installing this device, please read this document to ensure that the product is suitable for your application and is not limited in any way;
- Failure to follow the operating instructions or technical data may result in personal injury or property damage;
- Check the compatibility of the product material with the medium to be tested in all applications;
- The equipment is only used as the medium to be tested, and it must only be ensured that the equipment is used correctly for long-term stable operation.

Ensure that the tested medium will not cause damage to the tested part of the product;

! The responsibility for determining whether the measurement sensor is suitable for the application lies with the operator, and the manufacturer accepts no responsibility for the consequences of improper use by the operator. Improper installation and use of the sensor results in invalid claims under warranty.

Flow sensors monitor the medium flow of fluids

Precautions: Beware of personal injury, overpressure danger!

catalogue

1.1 Product Overview

According to Faraday's electromagnetic induction principle, when a conductive body passes perpendicularly through a magnetic field B, an electromotive force (EMF) will be induced. In this flowmeter, the moving conductor is the flowing conductive medium, and the magnetic field B is emitted perpendicular to the direction of the flowing medium, with the induced electromotive forces U at E1 and E2 proportional directly to the flow velocity V of the medium. U=K×B×V×D

K-factor of K-type flowmeter

D- internal probe spacing

The induced electromotive force U, after further processing, is converted into a standard electrical signal output or displayed.

1.2 Functional characteristics

- Compact design saves installation space
- Anti-corrosion sensor technology
- All electronic design without viscosity of moving parts
- Automatic temperature compensation
- Pulse output/analog output /RS485 communication optional
- Low pressure loss
- Strong anti-fouling ability

1.3 Technical parameter

◇ Measuring range: See range table

◇ Suitable pipe diameter: DN4... DN25(see selection table)

◇ Measuring medium: conductive liquid (conductivity >20uS/cm)

◇ Accuracy: ≤±0.5% range

◇ Repeatability: ≤±0.2% range

◇ Pressure resistance: 16 bar

◇ Supply voltage: 24±10%Vdc

◇ Current consumption: ≤80mA

◇ Electrical protection: reverse polarity protection, short circuit protection

◇ Output

Pulse output: NPN output, pull-up resistor 2K

Analog output: 4... 20mA, current limit 26mA, load resistance < 250Ω

◇ Response time: < 100ms

◇ Ambient temperature: -25... 85 ℃

◇ Medium temperature: -40... 120 No thermal shock (optional high temperature 160℃)

◇ Materials

Electrode: stainless steel 316TI

Process connection: stainless steel 316TI

Measuring tube: PEEK

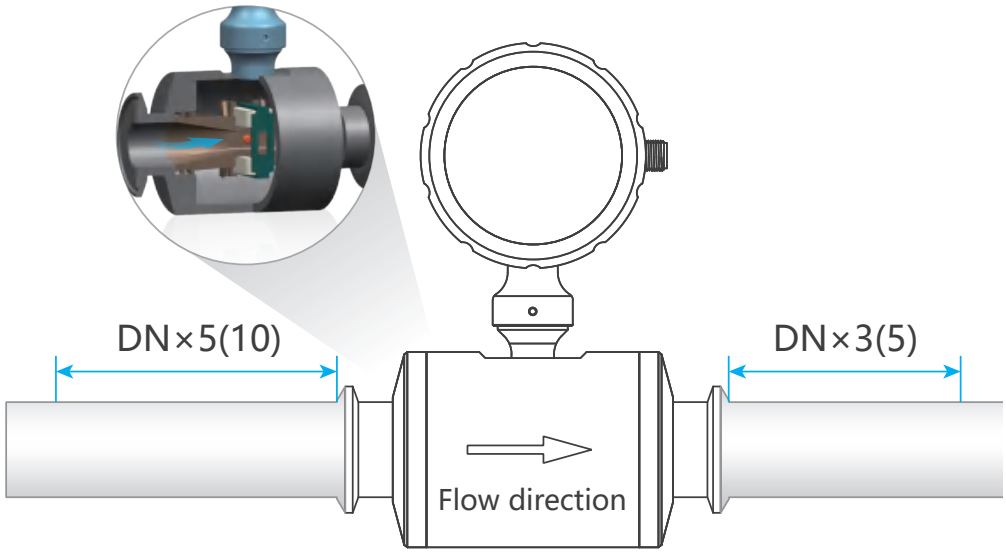
Seal: EPDM

Housing: stainless steel 304

◇ Electrical connection: M12×1 connector

◇ Process connection: external thread/internal thread/sanitary chuck can be selected

2.1 Installation precautions



Electromagnetic flowmeter installation method:

1. Select an installation position

The straight pipe section where the fluid flow is stable in the piping system should be selected. Generally, the length of the upstream straight pipe section is 5 to 10 times the pipe diameter, and the length of the downstream straight pipe section is 3 to 5 times the pipe diameter. Stay away from strong magnetic fields and strong electric field interference sources, such as large motors, transformers, high-voltage lines, etc. If it is not possible to stay away, shielding measures should be taken. The installation position should be easy to maintain and repair, and have enough operation space.

2. Installation method

Horizontal installation: The electromagnetic flowmeter can be installed horizontally, but it is necessary to ensure that the electrode axis is parallel to the ground, and the pipes at both ends of the flowmeter should be on the same horizontal plane to avoid high and low drop.

Vertical installation: can also be installed vertically, this time should ensure that the electrode axis and the ground vertical.

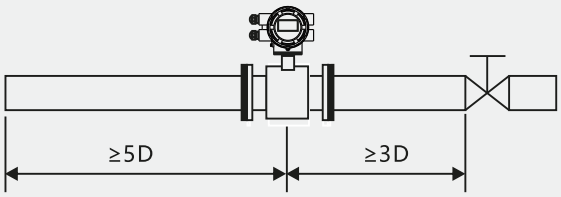
Electromagnetic flowmeter installation precautions:

Handle the flowmeter gently during installation to avoid collision and falling.

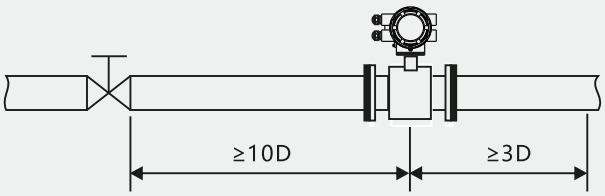
Install in strict accordance with the product instructions, and do not arbitrarily change the installation method and connection line.

After the installation is complete, check whether the connection parts are secure and the cables are correctly connected.

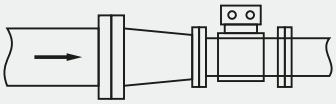
Straight pipe length requirements



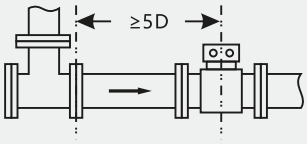
Valve is installed downstream of the sensor



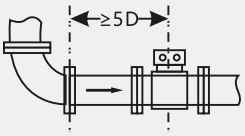
Valve is installed upstream of the sensor



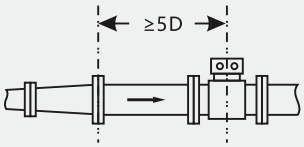
A tapered tube can be considered a straight tube



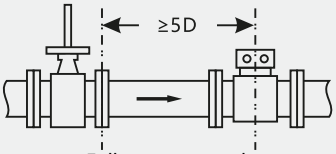
Tee joint



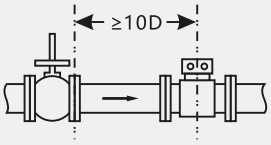
90°elbow



Expansion tube

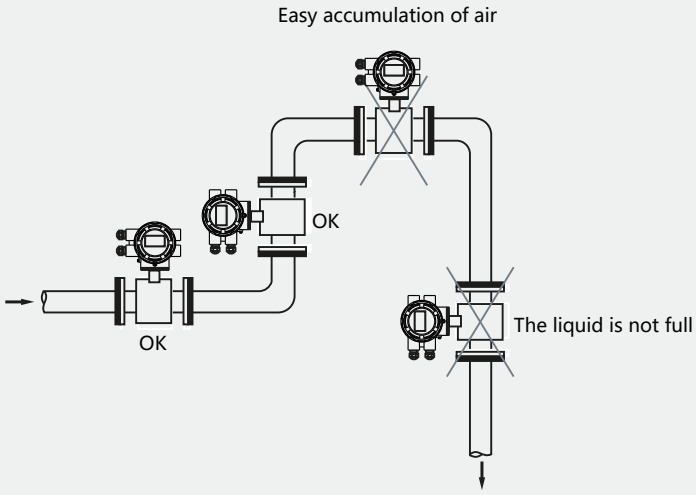


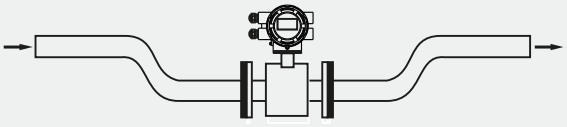
Full open gate valve



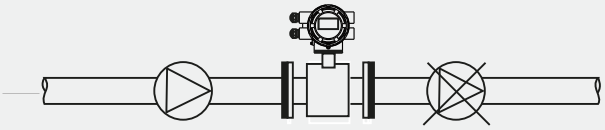
Various Kinds of Valves

Recommended installation location

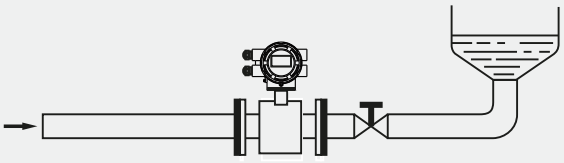




The sensor is lower than the installation of the pipe

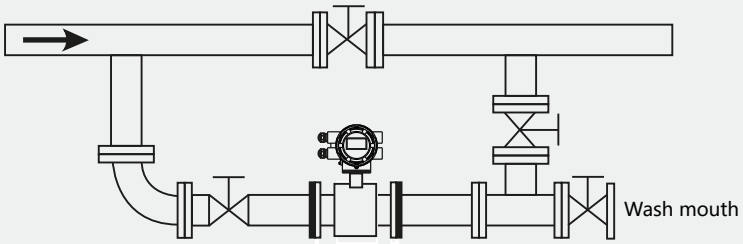


No electromagnetic flowmeter can be installed on the suction side of the pump to prevent negative pressure generated by vacuum



Downstream of the sensor there is back pressure installation

Easy to clean pipe connections



If the pipeline to be cleaned cannot be stopped, the side channel must be installed. To keep the system running while the equipment is being cleaned.

3.1 Wiring diagram

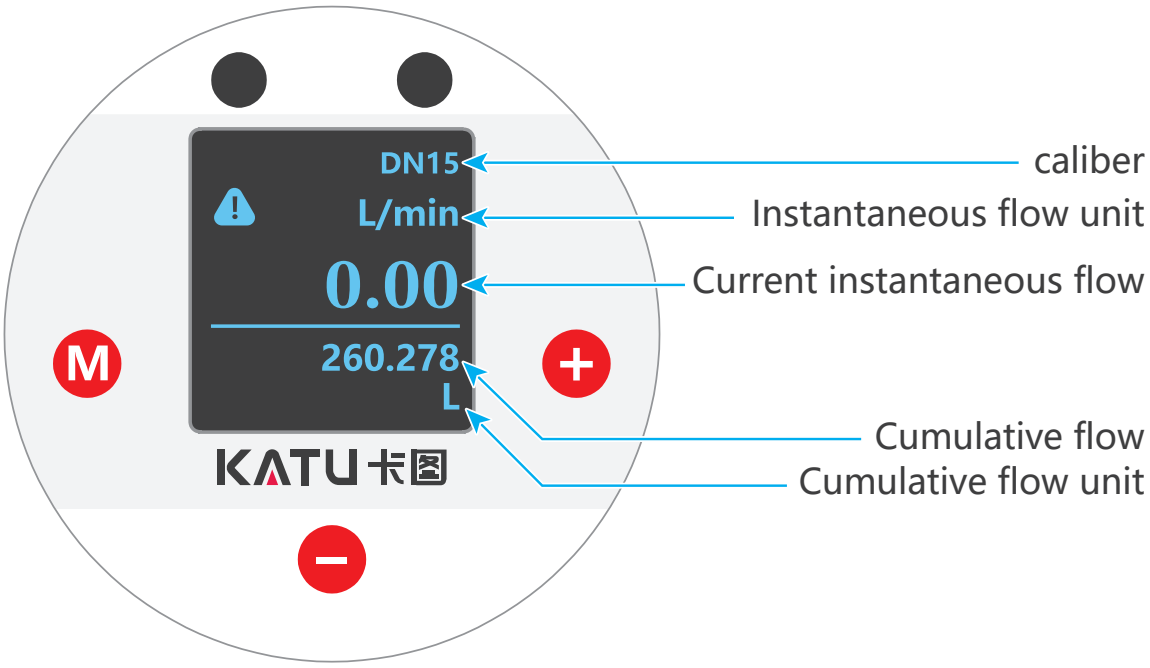
RS485/analog mA

stitch	color	function
1	BN	power supply(+)
3	BU	power supply(-)
5	GY	Analog quantity（mA）
2	WH	RS485(A)
4	BK	RS485(B)

Pulse/current /RS485

stitch	color	function
2	BN	power supply(+)
7	BU	power supply(-)
8	RD	RS485(A)
4	RU	RS485(B)
6	PK	pulse（+）
1	WH	pulse（-）
3	GN	Electric current（-）
5	GY	Electric current（+）

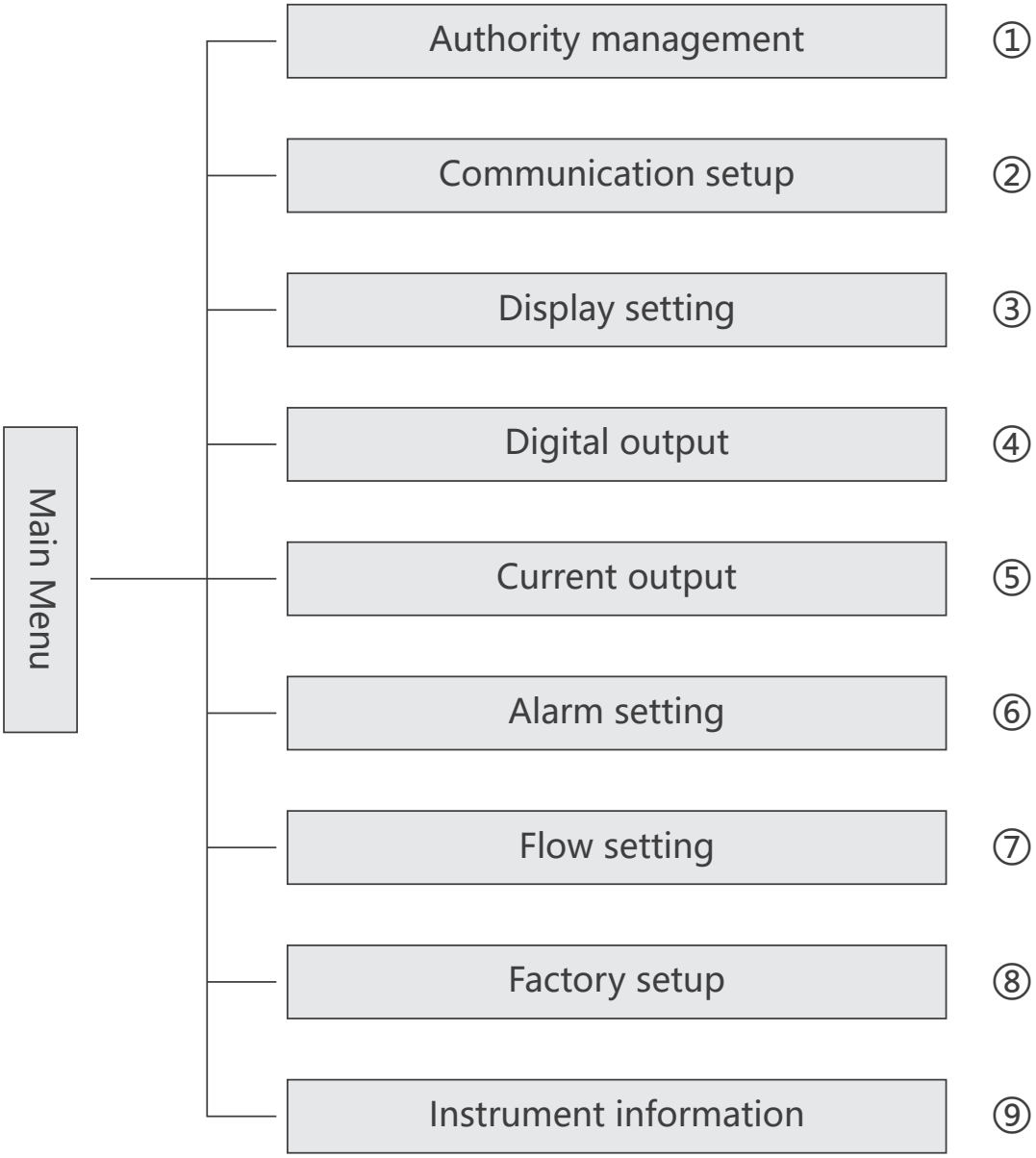
4.1 Description of panels and keys



Key description

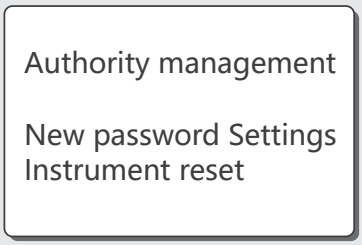
1. Long press the "M " key, the first time traffic related data appears, press again to display alarm information
2. Press M and - at the same time to enter the password menu. The maximum permission is 4, and the password is 000000
3. Press the + key to flip up, and the - key to flip down. Press the M and + keys at the same time to shift.
4. When the menu is displayed, press M and - to return to the previous menu, and hold down M to enter the current menu
5. Hold down the - and + keys at the same time, and hold down for 5 seconds to rotate the display screen 90 degrees. This operation is limited to the main screen.

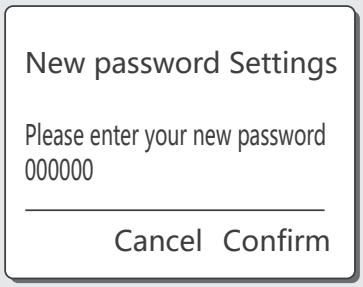
5.1 Main Menu

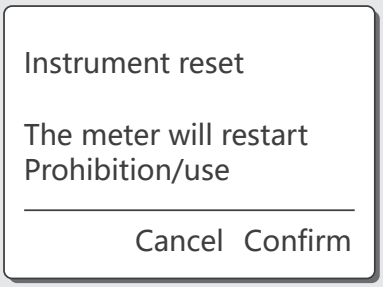

Main Menu
Authority management
①
Communication setup
②
Display setting
③
Digital output
④
Current output
⑤
Alarm setting
⑥
Flow setting
⑦
Factory setup
⑧
Instrument information
⑨

5.2 Menu introduction and operation

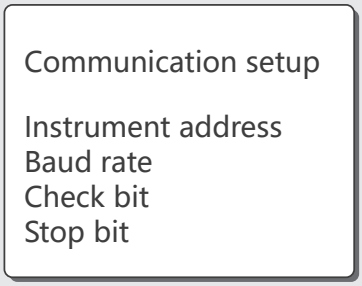
① Rights Management

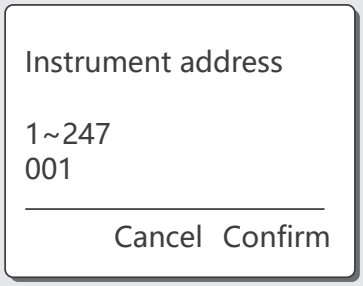


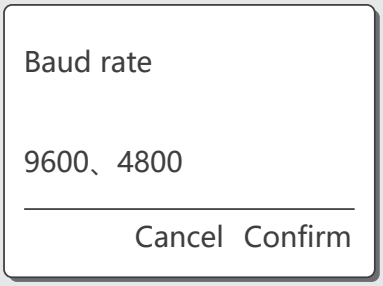


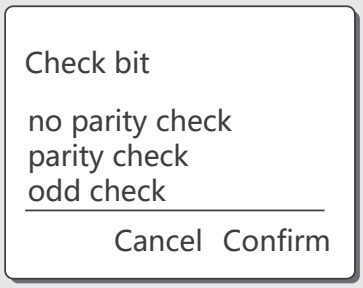


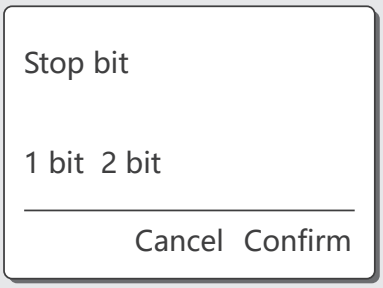
② Communication setup











③ Display setting

Display setting

Accumulator selection
Accumulator decimal place
Accumulator integer bit
Instantaneous quantity selection
User coding
Instantaneous decimal place
Language
rotate

Accumulator selection

Accumulator 1 Accumulator 2

Cancel Confirm

Accumulator decimal place

3 bit / 2 bit / 1 bit

Cancel Confirm

Accumulator integer bit

5~15
08

Cancel Confirm

Instantaneous quantity selection

Flow rate/Flow rate
/percentage of traffic

Cancel Confirm

User coding

Maximum 10 characters
EMF 0001

Cancel Confirm

Instantaneous decimal place

2 bit /3 bit /4 bit /1 bit/None

Cancel Confirm

Language

Chinese English

Cancel Confirm

rotate

0" 90 " 180" 270 "

Cancel Confirm

④ Digital output

Digital output

Output enable
Output polarity selection
Function selection
Pulse measurement polarity
Pulse equivalent
Pulse width
Frequency measurement polarity
Frequency range
Frequency duty cycle

Output enable

Enable/disable

Cancel Confirm

Output polarity selection

Low/high level

Cancel Confirm

Function selection

Frequency/pulse

Cancel Confirm

Pulse measurement polarity

Forward/reverse/bidirectional

Cancel Confirm

Pulse equivalent

0.0~100000000.0
1.0 L/P

Cancel Confirm

Pulse width

0.05~1000
1.00 ms

Cancel Confirm

Frequency measurement polarity

Forward/reverse/bidirectional
/ absolute value

Cancel Confirm

Frequency range

1~2000
1000 Hz

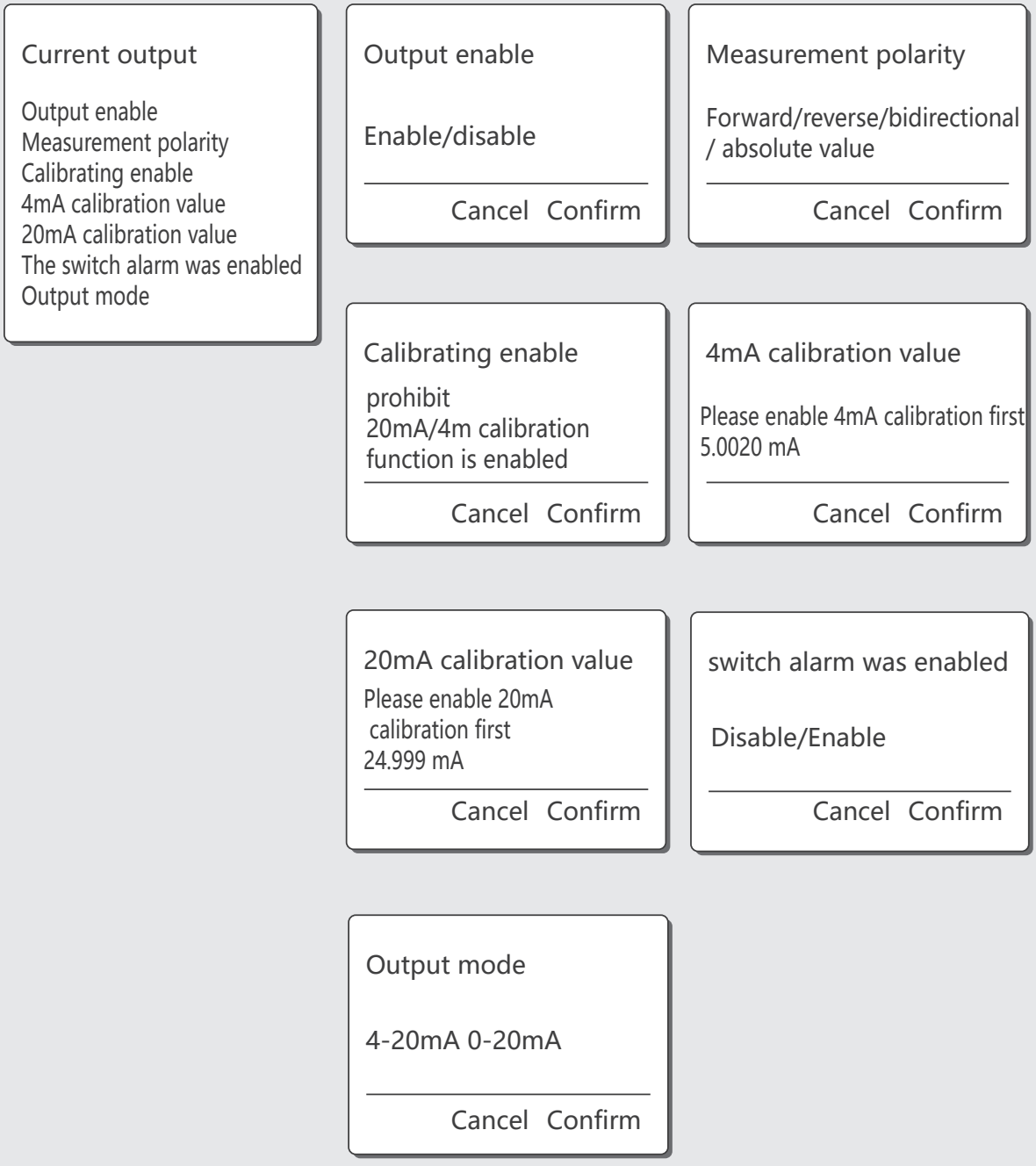
Cancel Confirm

Frequency duty cycle

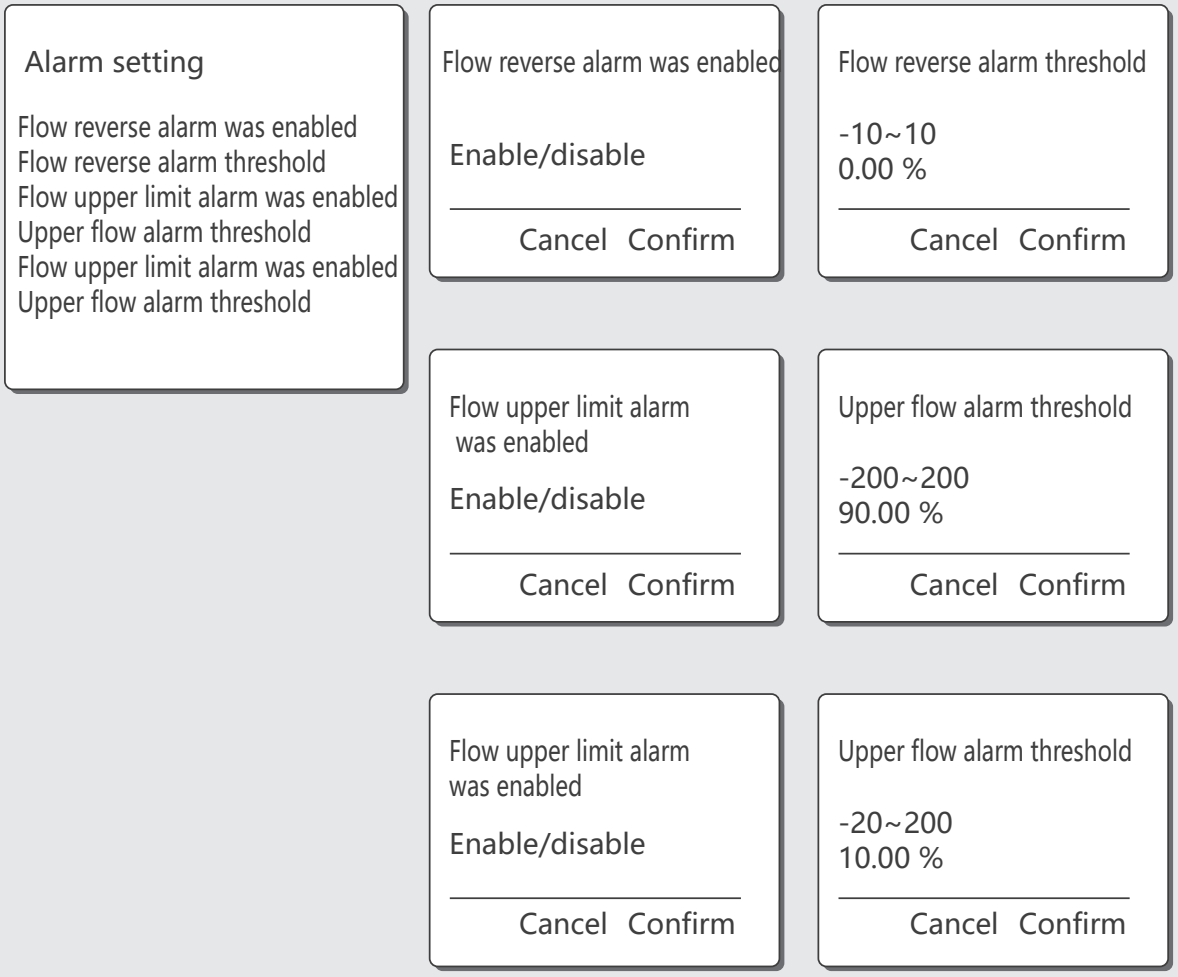
10~90
50 %

Cancel Confirm

⑤ Current output



⑥ Alarm setting



⑦ Flow setting

Flow setting

Flow
Accumulator 1 unit
Accumulator 1 Unit coefficient
Accumulator 1 function
Accumulator 1 Set
Accumulator 2 unit
Accumulator 2 Unit coefficient
Accumulator 2 function
Accumulator 2 Settings
Flow unit
Unit coefficient of discharge
Flow range
Low-flow excision
Flow direction setting
Flow reverse measurement was enabled
Filter constant
Subscriber instrument factor
User zero
The ATC detection was enabled. Procedure
Atc detection threshold
Excitation alarm enabled

Accumulator 1 unit

Max 5 characters
L

Cancel Confirm

Accumulator 1 Unit coefficient

0.000001~1000000
1000.00

Cancel Confirm

Accumulator 1 function

Forward cumulative
/reverse cumulative
/Total/net cumulative disabled

Cancel Confirm

Accumulator 1 Set

0.001~999999999
0.000 L

Cancel Confirm

Flow lower limit alarm
was enabled

Max 5 characters
L

Cancel Confirm

Accumulator 2 Unit coefficient

0.000001~1000000
1000.00

Cancel Confirm

Accumulator 2 function

Disable
/Forward accumulation/reverse
Cumulative to/total/net

Cancel Confirm

Accumulator 2 Set

0.001~999999999
0.000 L

Cancel Confirm

Flow unit

Max 8 characters
L/min

Cancel Confirm

Coefficient of flow unit

0.000001~1000000
16.6667

Cancel Confirm

Flow range

0.0001~999999
100.000 L/min

Cancel Confirm

Small signal excision

0.0001~1.0000
0.0050 m/s

Cancel Confirm

Flow direction setting

Forward/reverse

Cancel Confirm

Flow reverse measurement was enabled

Enable/disable

Cancel Confirm

Filter constant

0~10
00

Cancel Confirm

Subscriber instrument factor

0.5~1.5
1.0000

Cancel Confirm

User zero

-0.01~0.01
0.00000 m/s

Cancel Confirm

ATC detection was enabled . Procedure

Enable/disable

Cancel Confirm

Atc detection threshold

2.0~200.0
40.0 KΩ

Cancel Confirm

Excitation alarm enabled

Enable/disable

Cancel Confirm

⑧ Factory setup

Factory setup

caliber
Converter coefficient
Sensor coefficient
Sensor zero correction
Electrode impedance 200KΩ calibration value
Electrode impedance 0KΩ calibration value
system forward accumulator is set
System reverse accumulator Settings
Temperature 0 Resistor calibration value
Temperature 1K resistance calibration value
Nonlinear corrected flow rate 1
Nonlinear corrected flow rate 1 coefficient
Nonlinear corrected flow rate 2
Nonlinear corrected velocity 2 coefficient
Nonlinear corrected flow rate 3
Nonlinear corrected flow rate 3 coefficient
Nonlinear corrected flow rate 4
Nonlinear corrected velocity 4 coefficient
Nonlinear corrected flow rate 5
Non-linear correction velocity 5 coefficient

caliber

8~300
015 mm

Cancel Confirm

Converter coefficient

0.01~10.0
1.0000

Cancel Confirm

Sensor coefficient

0.01~10.0
1.0000

Cancel Confirm

Sensor zero correction

-0.2~0.2
0.00000 m/s

Cancel Confirm

Electrode impedance 200KΩ calibration value

Please separate the two signal electrodes to the ground
Don't connect the 200KΩ resistor
021.6 KΩ

Cancel Confirm

Electrode impedance 0KΩ calibration value

Please put the two signal electrodes
Short connect to ground

Cancel Confirm

system forward accumulator is set

0.001~999999999
00000000.000 m3

Cancel Confirm

System reverse accumulator Settings

0.001~999999999
00000000.000 m3

Cancel Confirm

Temperature 0 Resistor calibration value

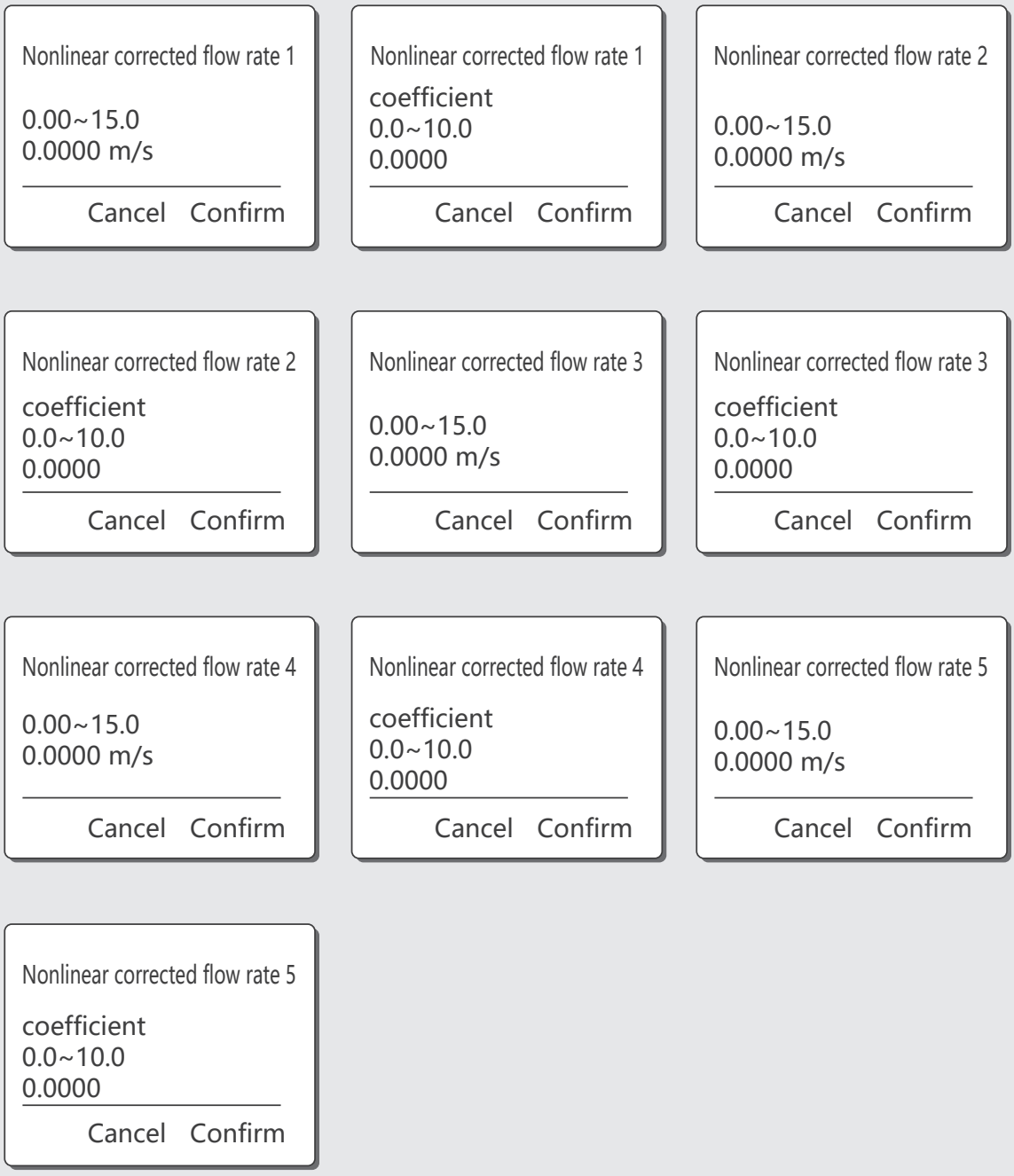
-50.0~50.0
0.00 Ω

Cancel Confirm

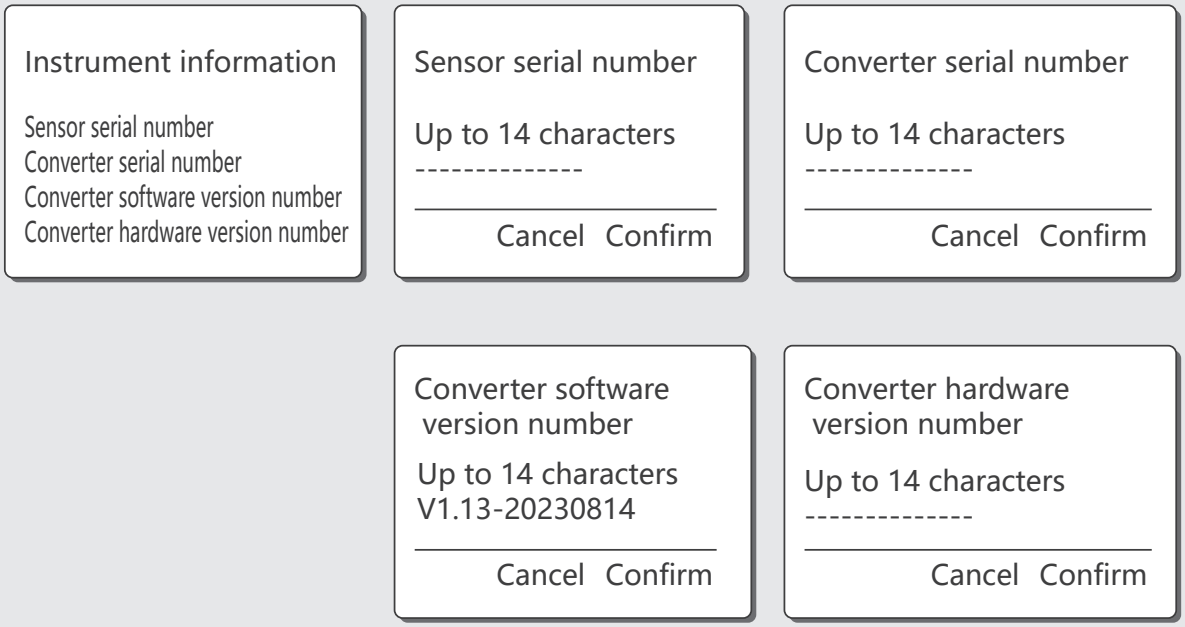
Temperature 1K resistance calibration value

950.0~1050.0
1000.00 Ω

Cancel Confirm


Nonlinear corrected flow rate 1
0.00~15.0
0.0000 m/s
Cancel Confirm
Nonlinear corrected flow rate 1
coefficient
0.0~10.0
0.0000
Cancel Confirm
Nonlinear corrected flow rate 2
0.00~15.0
0.0000 m/s
Cancel Confirm
Nonlinear corrected flow rate 2
coefficient
0.0~10.0
0.0000
Cancel Confirm
Nonlinear corrected flow rate 3
0.00~15.0
0.0000 m/s
Cancel Confirm
Nonlinear corrected flow rate 3
coefficient
0.0~10.0
0.0000
Cancel Confirm
Nonlinear corrected flow rate 4
0.00~15.0
0.0000 m/s
Cancel Confirm
Nonlinear corrected flow rate 4
coefficient
0.0~10.0
0.0000
Cancel Confirm
Nonlinear corrected flow rate 5
0.00~15.0
0.0000 m/s
Cancel Confirm
Nonlinear corrected flow rate 5
coefficient
0.0~10.0
0.0000
Cancel Confirm

⑨ Instrument information



6.1、Modbus Register address table

MODBUS register	Number of registers	data type	Chinese name	unit	Access authority	Description
0	2	float	Velocity of flow	m/s	R	Update once per measurement cycle
2	2	float	Volume flow	Same user unit	R	
4	2	float	Percentage of flow	%	R	Volume flow as a percentage of full scale
6	4	double	User accumulator 1	Same user unit	R/W	Changes can be made with the multi-register write command
10	4	double	User accumulator 2	Same user unit	R/W	
14	4	double	System forward accumulator	m3	R	-
18	4	double	System reverse accumulator	m3	R	-
22	2	float	temperature	℃	R	-
24	2	uint32_t	Give an alarm	-	R	0x0000: None 0x0001: Air flow control alarm 0x0002: flow reverse alarm 0x0004: flow upper limit alarm 0x0008: flow lower limit alarm 0x0010: Excitation coil alarm 0x0020: Storage exception alarm 0x0040: Low electrode resistance alarm 0x0080: Temperature upper limit alarm 0x0100: Temperature lower limit alarm 0x0200: Current open circuit alarm
26	1	uint16_t	Flow direction	-	R	0：forward 1： reverse
27	2	float	Electrode	ohm	R	-
29	2	float	PT1000 resistance value	ohm	R	

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