Metal Tube Rotameter
Operation Manual

Chongqing Chuanyi Automation Co., Ltd.
Flowmeter Branch

An open letter to users of Flowmeter Branch

Dear users,

Thanks for your long-time support to Chongqing Chuanyi!

Chongqing Chuanyi has fully implemented GB/T24001-2004 standard. We expect your support and cooperation in our environmental protection activities. It is recommended that you:

1. Be sure to understand the installation and operation manuals before using the meter, and install and use the meter in strict accordance with such manuals for fear of any safety accident.

2. Ensure that the meter installation, transportation, operation, storage, repair and scrapping meet applicable requirements of laws, regulations and environmental protection.

3. Properly keep combustible, explosive or poisonous dangerous goods, and take corresponding precautions during storage and transportation to prevent fire, explosion or spillage & leakage accidents that cause environmental pollution.

4. During construction, give priority to pollution-free or less-pollution construction equipment and advanced construction methods rather than those prohibited by national or local authority, take necessary measures to reduce the noise pollution, and dispose of wastes on the construction site properly.

5. Give active cooperation during operations, which may affect you in terms of environmental protection, by our service personnel in strict accordance with rules and regulations of the Company as well as relevant requirements.

Let us work together to protect the environment and the Earth!

CHONGQING CHUANYI AUTOMATION CO.,LTD.FLOWMETER BRANCH

Dear users,

Welcome to use our products. Before use, please read the Instruction carefully to have a good understanding of correct installation and operation methods of products, thus ensuring the correct installation and operation and the best performance of the meter.

We always insist on the service tenet of "SIC ACCOMPANIES CUSTOMERS AND CUSTOMERS IN THE HEART OF SIC". In case of any problem during the use of the meter, please contact us. We will assume no liability for performance damage to the meter on account of repair or replacement of components without authorization.

Customer service center: 023-67032695

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Metal Tube Rotameter

I. Technical Service and Warranty

1. Under normal circumstances, on-site installation and commissioning services will not be provided for this product. If there is any requirement, please explain it before signing the contract.

2. It is important to read the product installation and commissioning instructions carefully before installation and commissioning.

3. If you have any questions during the selection, installation, and use of the meter, please consult us by telephone.

4. If users need on-site service, our personnel can arrive at the designated site within 72h.

5. The warranty period of the meter is 1 year. We will be responsible for repairing free of charge in case of failure due to quality problems of the product itself during the warranty period; for product damage due to model selection or operation errors and other human factors, the paid repair service is available.

6. Please record data regularly at least every day when using the meter, and reach an agreement with relevant units or individuals in terms of data processing in case of meter failure or maintenance. Our company will not bear any losses caused thereby.

II. Unpacking

After opening the packing box and removing the fillers in the package, it is necessary to carefully check each item on the packing list, including meter model, installation accessories, instructions, etc. If there is any missing item, inconsistency with the packing list or damage, please contact our company immediately.

III. Attached Accessories

The meter has been packed completely before delivery, and the attached accessories include:

■ Instructions ■ Certificate of Conformity ■ Packing List ■ Calibration Certificate

■ Other accessories (such as companion flanges, magnetic filters, straight pipe sections and fasteners) are separately specified in the contract.

IV. Precautions for Storage

After arrival, if the meter needs to be stored for a long time, special attention shall be paid to the following matters:

(1) The meter shall be packed in the original packing case, and shall be kept in the same state as that before delivery as far as possible.

(2) Select the storage location according to the following conditions and do not place it in wind and rain.

• No exposure to vibration or impact. • The junction box cover of the meter shall not be opened for fear of moisture affecting the normal operation of the meter.

• Ambient temperature, humidity and atmospheric pressure shall be: ambient temperature: -20°C~+60°C; relative humidity: 5%~90% RH; atmospheric pressure: 86kPa~106kPa

V. Product Overview

1. RFC series metal tube rotameter can be used to measure the flow of liquid, gas and steam media. It is widely used in flow measurement and process control in petroleum, chemical industry, metallurgy, electric power, papermaking, food, pharmacy and other industries.

2. The executive standard for RFC series metal tube rotameter is JB/T6844. It conforms to the national standard of JB/T6844-2015, and the factory verification meets the verification regulation of JJG257-2007.

3. This product has been inspected and approved by the explosion-proof quality inspection agency designated by the state, and meets relevant requirements.

The explosion-proof mark is:

Intrinsically safe: Ex ia IIC T1-T5 Gb Dust intrinsically safe: Ex ia IIIC T 100°C-450°C Db

Flameproof: Ex db IIC T1-T6 Gb Dust flameproof: Ex tb IIIC T85°C-450°C Db

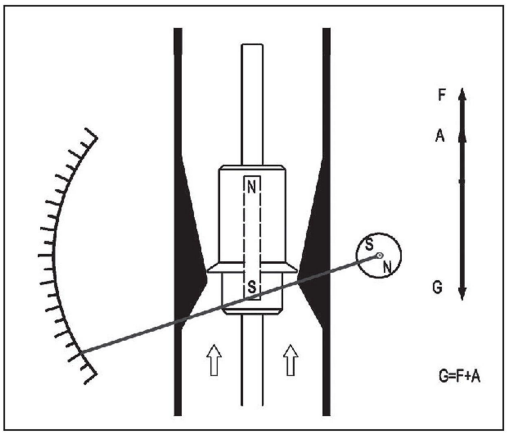
VI. Meter Structure, Working Principle and Product Features

1. Meter structure

RFC metal tube rotameter consists of a measuring tube and an indicator. The measuring tube includes taper tube or orifice plate, guider, stopper, float and other components, and the indicator includes magnetic servo system, pointer, dial, circuit board (remote transmission) and other components.

2. Working principle

When the float in the measuring tube is subject to the upward impulse AR and buoyancy F of the medium and balances with the downward float gravity G, the float is stable at a position in the measuring tube, which corresponds to the flow rate. The follow-up magnetic steel of the indicator is coupled with the magnetic steel in the float to drive the pointer and the sensing magnetic steel to rotate. The corresponding flow value is read out through the dial and the pointer, converted into electrical signals by the magnetic sensor, and displayed as instantaneous flow and cumulative flow after being processed by the circuit.



Schematic Diagram **Structure Diagram**

3. Meter characteristics

(1) Uniform magnetic field technology is adopted to make the float become a rotor for more stable measurement.

(2) Multi-section taper tube technology is adopted to make the dial tend to be linear.

(3) Double indication system can meet diverse user needs in different working conditions. The panel is made of aluminum, and the long pointer indicates it mechanically, which makes the panel more beautiful. The low-power full-view double-line backlight LCD can display instantaneous flow, cumulative flow and corresponding units at the same time.

(4) The magnetic damping system can effectively reduce the pointer jitter.

(5) The geomagnetic interference compensation device is added to effectively overcome the influence of geomagnetic field on the meter.

(6) It is suitable for micro-flow measurement of different media.

(7) Integrated multi-parameter temperature and pressure compensation design.

(8) Float stuck alarm, pulse overrun alarm, upper and lower limit alarms.

(9) IP65/IP66/IP67 protection design.

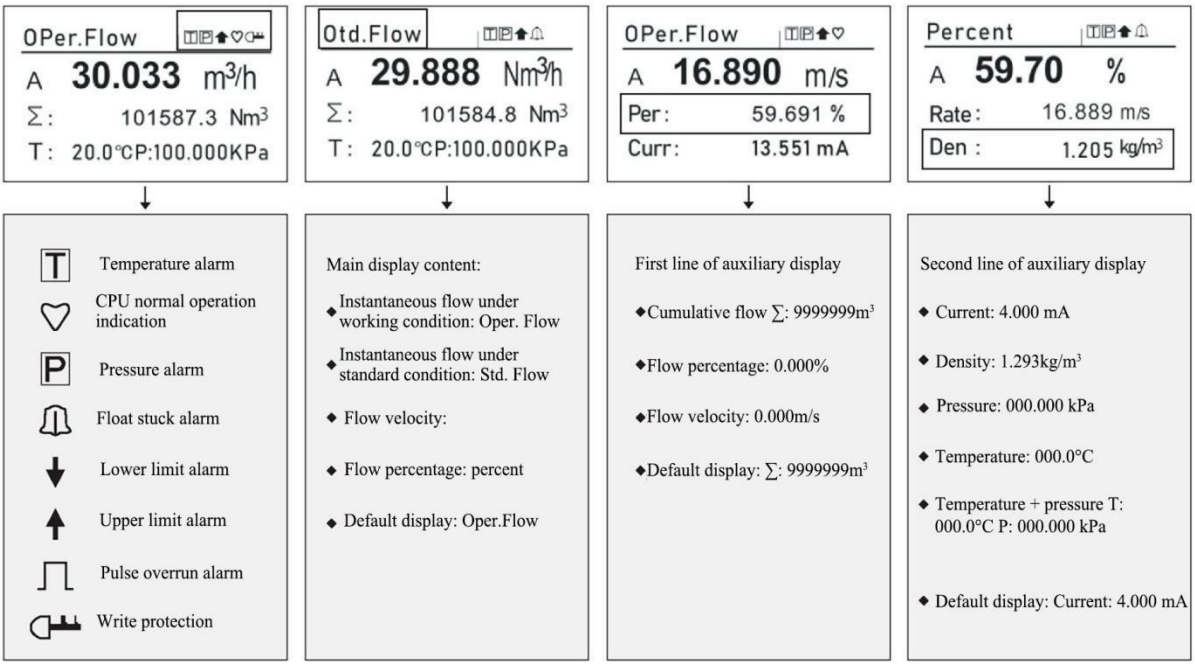
(10) It has temperature and pressure compensation functions, relay alarm output, NAMUR switch signal output, Hart, ModBus protocol output, graphic liquid crystal display design, and can be switched to multiple interfaces for display.

VII. Technical Parameters

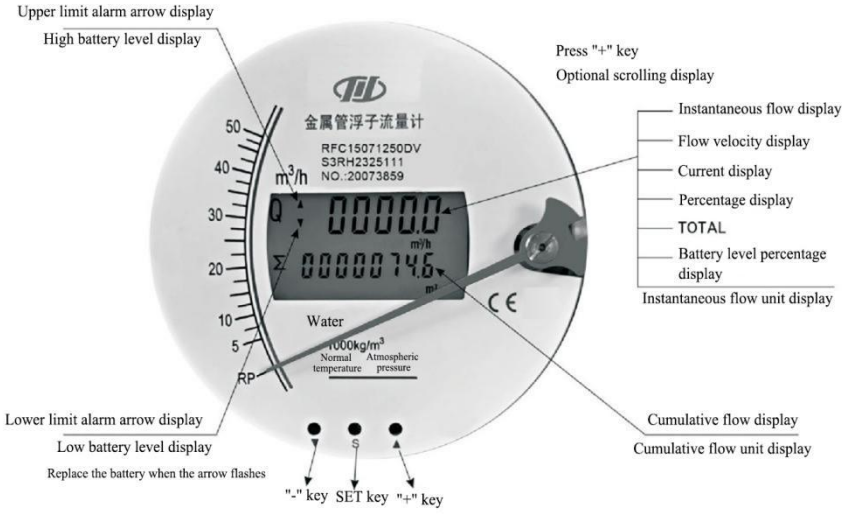
Measurement range	Water: 20°C (10~200000) L/h Air: 20°C, 0.1013 MPa (0.5~2000) m^3/h
Turndown ratio	Standard type 10:1, Customized type 20:1
Accuracy class	Standard type: Class 1.5; Customized type: Class 1.0;
Pressure grade	Standard type: DN15~DN50≤4.0 MPa DN65 ~ DN200≤1.6 MPa Special type: DN15~DN50≤32 MPa DN65 ~ DN200≤16 MPa The pressure grade of clamp type and jacket type is 1.6 MPa, and the pressure grade of customized type needs to be negotiated during selection.
Connection mode	Flange connection, clamp connection, threaded connection and jacketed connection
Medium temperature	Standard type: -20°C~100°C; PTFE type: 0°C~80°C; PF type: 0°C~120°C High temperature type: 100°C~450°C (explosion-proof type: 400°C); Low temperature type: -80°C~-20°C
Ambient temperature	-40°C-+60°C
Power supply	Standard/alarm type: 24VDC two-wire system (4~20) mA (12VDC- 32VDC) AC type: (100-240) VAC50Hz~60Hz Battery type: 3.6V@9AH lithium battery, which can be used continuously for three years
Load characteristic	RLmax=600 Ω Intrinsically safe type: 500Ω
Alarm selection	Single-point alarm, upper and lower limit alarms, NAMUR switch, NAMUR switch + single-point alarm, NAMUR switch + upper and lower limit alarms, relay alarm
Pulse output	Cumulative pulse output is the output of optocoupler signal isolated Darlington tube (internal power supply is 24 VDC, and maximum current is 8 mA)
Explosion-proof mark	Flameproof Ex db II CT1 ~T6 Gb; Dust flameproof: Ex tb III CT 85°C~450°C Db; Intrinsically safe: Ex ia II CT1 ~T5 Gb; Dust intrinsically safe: Ex ia III CT 100°C~450°C Db
Output signal	4-20 mA; 4-20 mA + HART; 4-20 mA + RS485; PA; FF; 4-20 mA + Pulse
Medium viscosity	DN15:n<5mPa.s(S15.0~S15.3), n<30mPa.s(S15.4-S15.10) DN25:n <250 mPa.s; DN50 ~ DN200: η<300 mPa.s
IP rating	IP65;IP66;IP67
Language	Chinese/English/Russian

VIII. Description of LCD and Meter Structure

1. Chinese and English LCD



2. English LCD display



3. Function List of Chinese and English LCD Series and English LCD Series

Display		Chinese and English LCD	English LCD
Power supply mode	Local type	×	×
	AC power supply	√	√
	Battery power supply	×	√
	24V two-wire power supply	√	√
	24V multi-wire power supply	√	√
Alarm selection	No alarm	√	√
	Upper and lower limit alarms, pulse and batch output of optocoupler Darlington tube	√	√
	NAMUR switch one alarm point (upper or lower limit)	√	√
	NAMUR switch two alarm points (upper and lower limits)	√	√
	Relay single-point alarm (upper or lower limit)	√	√
	Relay double-point alarm (upper and lower limits)	√	×
Communication protocol	No communication protocol	√	√
	Hart protocol	√	√
	ModBus protocol	√	√
	FF field bus	×	√
	ProfiBus-PA field bus	×	√
Temperature and pressure compensation	Single temperature compensation	√	×
	Single pressure compensation	√	×
	Temperature and pressure compensation	√	×
Additional features	One-key reset	√	√
	Float stuck alarm	√	×
	Pulse overrun alarm	√	×
	Chinese/English display	√	×

"√" indicates that this function is available, and "×" indicates that it is unavailable.

4. Meter structure description



Bottom-in and top-out



Right-in and left-out



Left-in and right-out



Bottom-in and side-out



Side-in and side-out



Top-in and bottom-out



Clamp connection



Threaded connection



Ferrule connection/micro



Stainless steel housing

IX. Installation Diagram

Where:

5 × DN IS THE LENGTH OF FRONT STRAIGHT PIPE SECTION

250 mm is the length of the rear straight pipe section

A is the reserved space for magnetic filter installation

Below DN100, A=100 mm

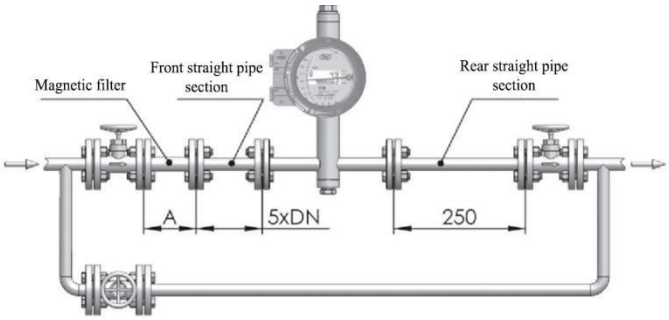
Above DN100, A=150 mm

Notes:

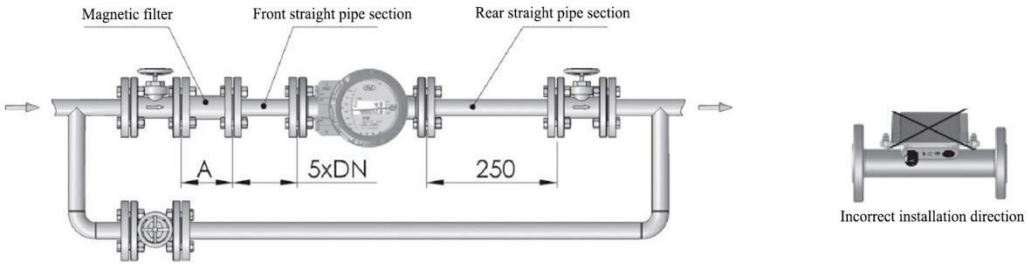
1. If the front and rear pipe sections meet the installation requirements, straight pipe sections are not required

2. If there is no ferromagnetic substance in the medium, the magnetic filter is not required

Schematic Diagram of Bottom-in and Side-out Installation	Schematic Diagram of Side-in and Side-out Installation



Schematic Diagram of Horizontal Installation (Left-in and Right-out/Right-in and Left-out)



Schematic Diagram of Horizontal Spring (Left-in and Right-out/Right-in and Left-out) Installation

X. Precautions for Installation and Use

1. The meter is precision equipment, so in the process of transportation, installation, storage and use, we must handle them with care, and barbaric transportation, overstress installation and misplacing everywhere are prohibited. The relative position of the indicator and the sensor cannot be changed. Once the relative position changes, it will directly affect the measurement accuracy of the meter.

2. Before meter installation, the process pipeline shall be purged to prevent the ferromagnetic substances retained in the pipeline from adhering to the meter, affecting the performance of the meter and even damaging the meter. If ferromagnetic substance is inevitable, a magnetic filter shall be installed at the meter inlet. The meter shall be exempted from air purging before production to avoid damage.

3. Before the meter is installed in the process pipeline, the filler (to prevent the float from moving during transportation) in the measuring tube shall be taken out, and it is required to check whether the meter is damaged during transportation.

4. The installation form of the meter is divided into vertical installation and horizontal installation. In the case of vertical installation, the included angle between the central vertical line of the meter and the plumb line shall be less than 2°; in the case of horizontal installation, the included angle between the horizontal center line of the meter and the horizontal line shall be less than 2°.

5. The upstream and downstream pipelines of the meter shall have the same nominal caliber as the meter, and the connecting flange or thread shall match the flange and thread of the meter. The length of the upstream straight pipe section of the meter shall be 5 times of the nominal caliber of the meter, and the length of the downstream straight pipe section shall be 250 mm or more.

6. The meter transmits signals through magnetic coupling, so in order to ensure the accuracy of the meter, ferromagnetic substances are not allowed within a radius of at least 10 cm around the installation, and the distance should be ensured to be greater than or equal to 300 mm when densely installed side by side.

7. The meter for measuring gas is calibrated with air at 0.1 MPa and 20°C. If the gas is directly discharged to the atmosphere at the meter outlet, a pressure drop will be generated at the float, which will make the pointer of the meter pointer. If this is the case, a valve shall be installed at the meter outlet, and the valve opening should be turned down during operation.

8. Meters installed in pipelines shall not be subjected to stress, and the meter inlet and outlet shall be supported by suitable pipelines to keep the meters at the minimum stress.

9. The PTFE-lined meters shall be installed with special care. PTFE will be deformed under pressure, so it is necessary to install another PTFE gasket to avoid flanging and fracturing the lining.

10. In the process of long-term use, ferromagnetic substances are inevitably adsorbed on the float in the pipeline. If there are too many impurities, the float will be stuck or the measurement accuracy will be affected, so the measuring tube of the meter should be cleaned regularly. If a magnetic filter is installed at the meter inlet, the filter should also be cleaned regularly.

11. The indicator of the meter is equipped with electronic devices, so when the meter is disassembled or used, the screw or cover should be tightened to keep the housing sealed, and the liquid and ferromagnetic substances must be prevented from entering, and the meter housing should be reliably grounded.

12. When the meter is used for the first time, the following two points shall be paid attention to:

Liquid measurement: In the process of opening the valve, in order to avoid sudden opening of the valve, head impact and damage to the meter, it is necessary to open the valve slowly.

Gas measurement: Do not pressurize the pipeline before opening the valve. Otherwise, if the valve is suddenly opened, the float will rush to the stopper and may damage the meter, so be sure to open the valve slowly. The meter for measuring gas can be equipped with a pneumatic damping device to minimize the oscillation of the float.

13. For the intelligent indicator, it is required to first ensure that the electrical wiring is correct, and then it can be powered on. Otherwise, it is easy to damage the meter. For the key operation, the instructions for use must be observed, and it is prohibited to operate blindly. Otherwise, the data stored in EEPROM in the meter will be lost or damaged.

14. The meter shall be stored at -20℃~+60℃, where the relative humidity is not more than 90% and there is no rain, snow, sun exposure and corrosive gas.

15. When cleaning, it is required to avoid washing the meter shell with water to prevent water from entering the

meter shell and damaging the meter.

16. Due to the pressure loss of the flowmeter, the medium pressure at the installation position of the meter must be greater than the pressure loss of the flowmeter.

17. For meters with LCD screen, try to install the meter in such way that direct sunlight on the screen can be avoided as much as possible; otherwise, the service life of the LCD may be shortened.

18. When measuring low-temperature medium, if thermal insulation jacket or vacuum jacket is not ordered, thermal insulation treatment is needed on site.

19. Before wiring the meter, it is required to determine the power supply and output mode of the meter, and determine the terminal numbers of the power supply and signal on the circuit board to avoid damage to the meter caused by wrong connection.

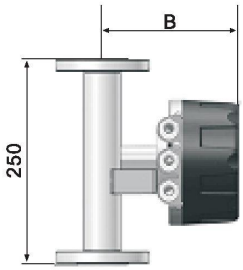
20. The user must follow the requirements of this manual to ensure the correct and safe use of the meter.

XI. Overall Dimensions and Weight

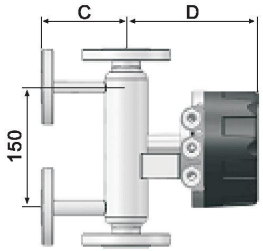
1. Overall dimensions and weight of standard type/jacket type whole machine installed vertically (bottom-in and top-out)

Specification	B Standard type	B High temperature type	C	D	Standard type approx. weight /Kg	Jacket type aprox. weight /Kg
DN15	139	179	100	139	3.6	6.4
DN20	139	179	110	139	4.1	6,9
DN25	139	179	110	139	5.5	10.4
DN32	139	179	120	139	6.1	10.9
DN40	139	179	120	158	6.6	11.1
DN50	158	179	120	158	9.6	12.4
DN65	158	179	140	158	10.1	12.9
DN80	158	179	140	158	13.35	20
DN100	179	234	150	179	16.9	21
DN125	179	234	185	234	17.9	*22*
DN150	234	234	185	234	33.6	35
DN200	234	234	210	234	48.6	50





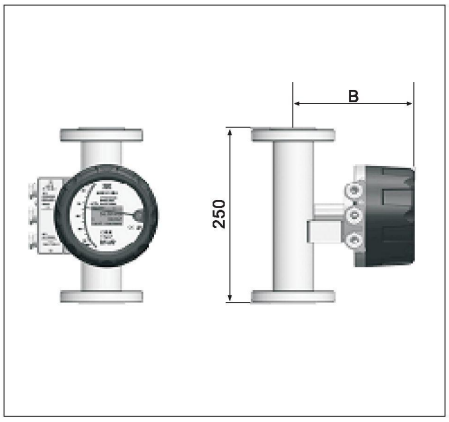
Standard type



Jacket type

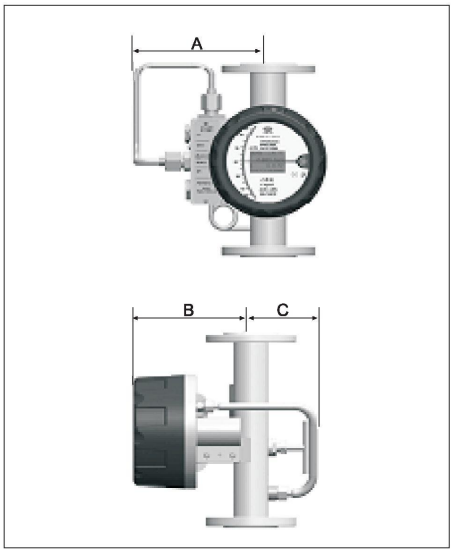
2. Overall dimensions and weight of standard type fluorine-lined whole machine installed vertically (bottom-in and top-out)

Specification	B	Approx. weight /Kg
DN15	139	3.9
DN20	139	4.2
DN25	139	5.4
DN32	139	6.5
DN40	158	7.5
DN50	158	8.3
DN65	158	10.5
DN80	158	14.4
DN100	179	17



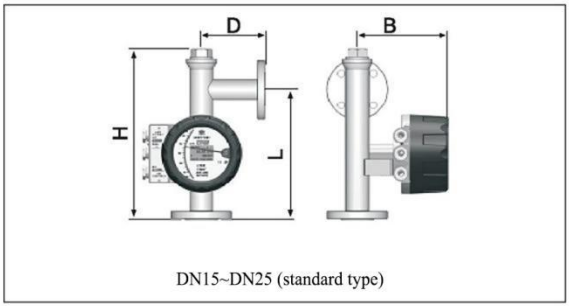
3. Overall dimensions and weight of temperature and pressure compensation type whole machine installed vertically

Specification	A	B	C	Approx. weight /Kg
DN15	220	139	150	4.1
DN20	220	139	150	5
DN25	220	139	150	6
DN32	220	139	150	7.5
DN40	236	158	166	9
DN50	236	158	166	10.1
DN65	249	158	179	12.5
DN80	249	158	179	13.9
DN100	259	179	189	17.4
DN125	277	234	207	32
DN150	277	234	207	34.1
DN200	307	234	237	49.1

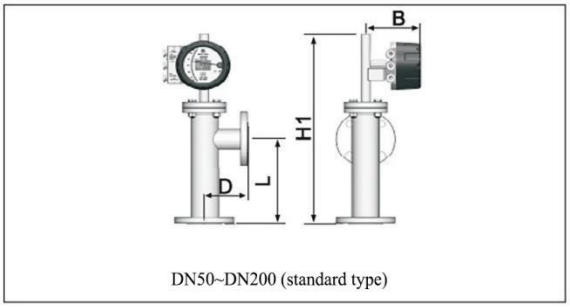


4. Overall dimensions and weight of standard type/jacket type whole machine installed from the bottom side (bottom-out and top-in)

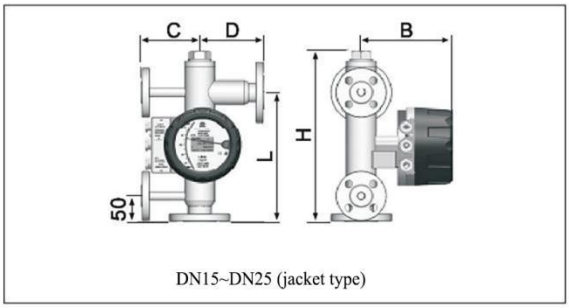
Specification	B Standard type	B High temperature type	C	D	H	H1	L	Standard type approx. weight /Kg	Jacket type aprox. weight /Kg
DN15	139	179	100	120	330		250	4.7	7.4
DN20	139	179	110	120	340		250	5.3	8
DN25	139	179	110	120	340		250	7.6	10.5
DN32	139	179	110	120	340		250	9	11
DN40	139	181	120	120		560	250	11	13
DN50	139	181	120	120		560	250	15	17.5
DN65	139	181	140	150		595	250	20	23
DN80	139	181	140	150		595	250	25	28
DN100	139	181	150	150		600	250	29	32.5
DN125	139	181	185	180		690	300	35	40
DN150	139	181	185	180		690	300	53	57
DN200	139	181	210	200		780	350	61	66



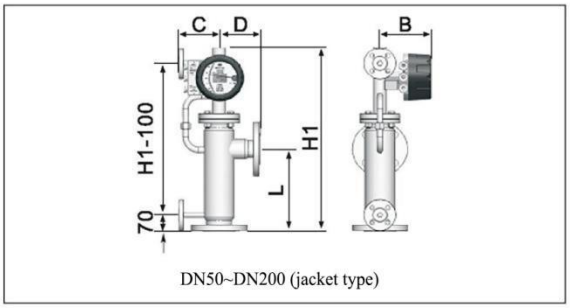
DN15~DN25 (standard type)



DN50~DN200 (standard type)



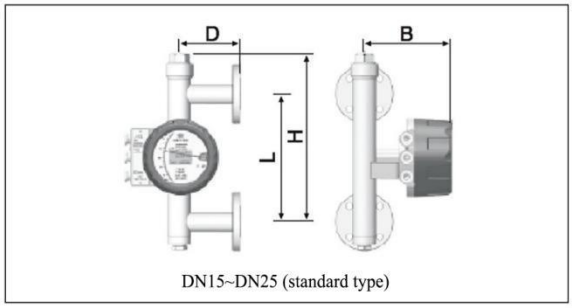
DN15~DN25 (jacket type)



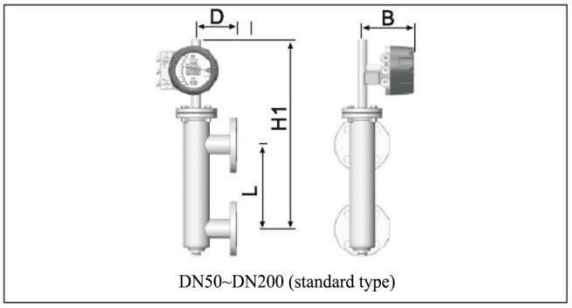
DN50~DN200 (jacket type)

5. Overall dimensions and weight of standard type/jacket type whole machine installed on side (side-in and side-out)

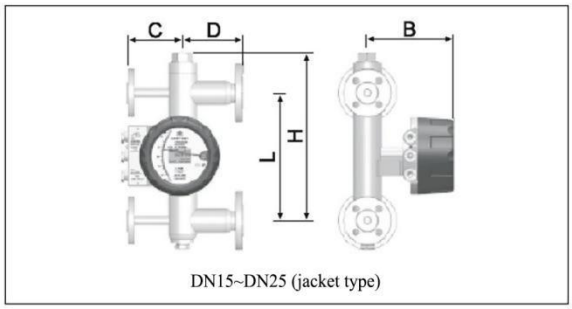
Specification	B Standard type	B High temperature type	C	D	H	H1	L	Standard type approx. weight /Kg	Jacket type aprox. weight /Kg
DN15	139	179	100	120	330		250	5	7.7
DN20	139	179	100	120	340		250	5.7	8.4
DN25	139	179	100	120	340		250	8.3	11.2
DN32	139	179	100	120	340		250	9.7	11.7
DN40	139	181	120	120		560	250	11.7	13.7
DN50	139	181	120	120		560	250	16.3	18.7
DN65	139	181	140	150		575	250	23.7	26.7
DN80	139	181	140	150		575	250	27.9	30
DN100	139	181	150	150		590	250	33.2	39.5
DN125	139	181	185	180		690	300	40	45
DN150	139	181	185	180		690	300	57.7	63
DN200	139	181	210	200		780	350	68	74



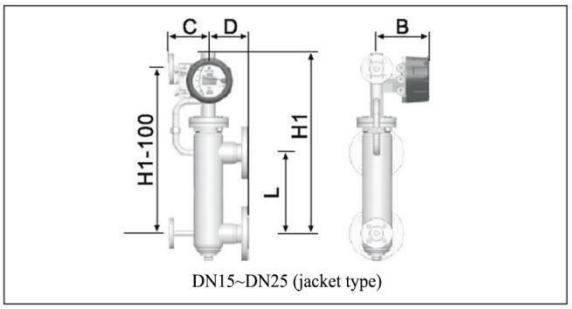
DN15~DN25 (standard type)



DN50~DN200 (standard type)



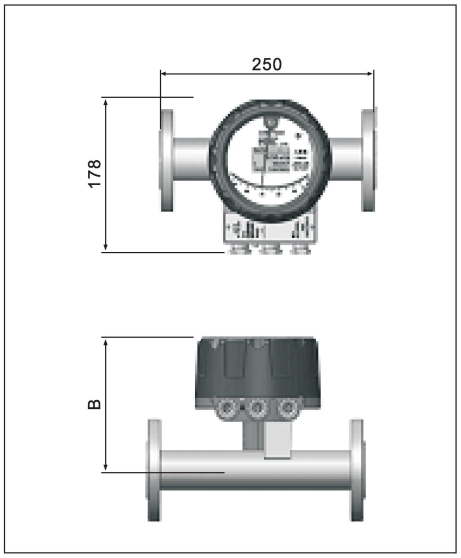
DN15~DN25 (jacket type)



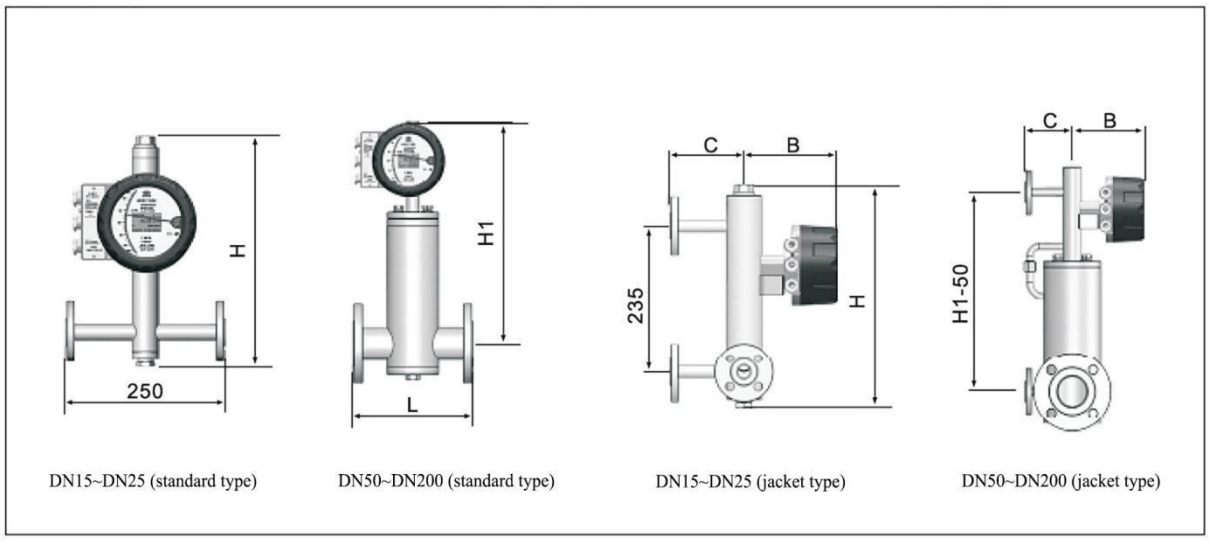
DN15~DN25 (jacket type)

6. Overall dimensions and weight of standard type whole machine with horizontal spring (left-in and right-out/right-in and left-out)

Specification	B Standard type	B High temperature type	Approx. weight /Kg
DN15	139	179	3.9
DN20	139	179	4.2
DN25	139	179	5.4
DN32	139	179	6.5
DN40	158	179	7.5
DN50	158	179	8.3
DN65	158	179	10.5
DN80	158	179	14.4
DN100	179	234	16
DN125	234	234	18
DN150	234	234	33
DN200	234	234	48



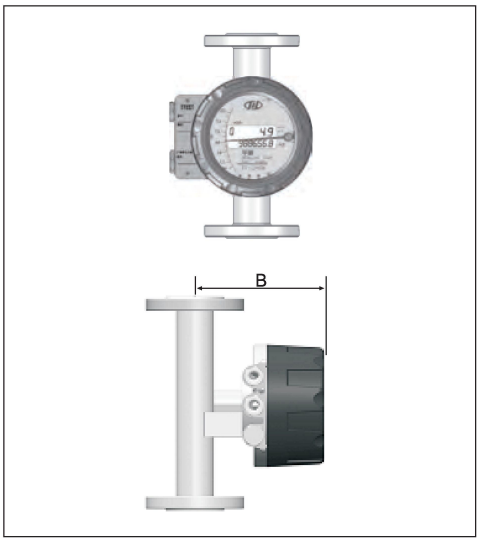
7. Overall dimensions and weight of standard type/jacket type whole machine installed horizontally (left-in and right-out/right-in and left-out)



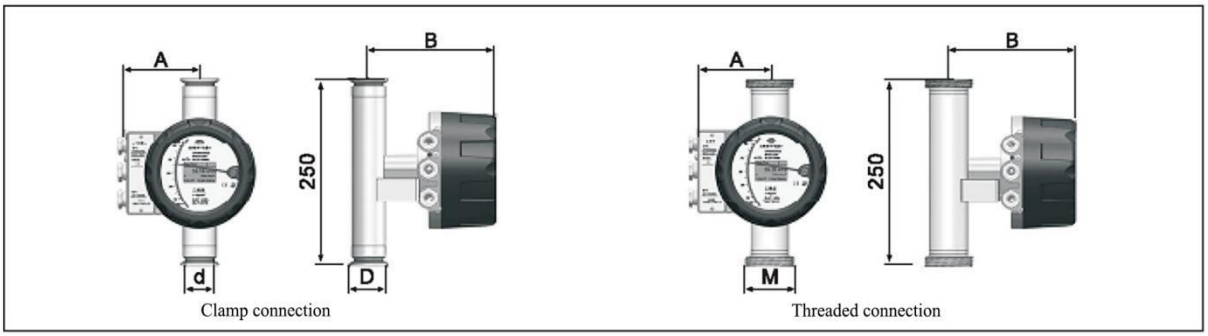
Specification	B Standard type	B High temperature type	C	H	H1	L	Standard type approx. weight /Kg	Jacket type aprox. weight /Kg
DN15	139	179	100	355		250	5.3	8
DN20	139	179	100	370		250	6	8.8
DN25	139	179	100	370		250	8.7	11.5
DN32	139	179	100	370		250	10	12
DN40	139	181	150		485	250	12	14
DN50	139	181	150		485	250	16.6	19
DN65	139	181	190		520	250	24	27
DN80	139	181	190		520	400	28.2	32.5
DN100	139	181	210		540	400	33.5	39.8
DN125	139	181	238		600	500	45	48
DN150	139	181	238		600	500	58	63.4
DN200	139	181	290		800	550	71	81

8. Overall dimensions and weight of standard type whole machine installed vertically (top-in and bottom-out)

Specification	B Standard type	B High temperature type	Approx. weight /Kg
DN15	139	179	3.9
DN20	139	179	4.2
DN25	139	179	5.4
DN32	139	179	6.5
DN40	158	179	7.5
DN50	158	179	8.3
DN65	158	179	10.5
DN80	158	179	14.4
DN100	179	234	16
DN125	234	234	18
DN150	234	234	33
DN200	234	234	48



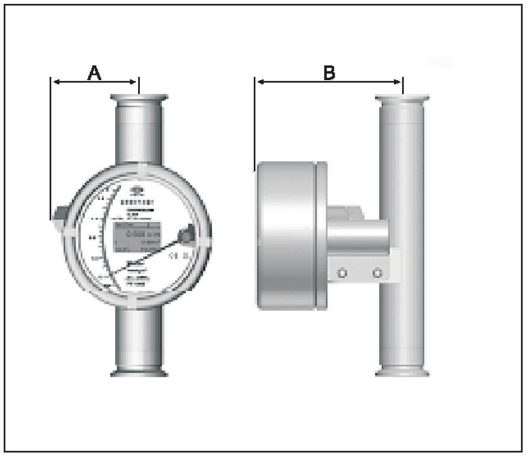
9. Overall dimensions and weight of sanitary clamp connection/threaded connection type whole machine



Specification	A	B	d	D	M	Approx. weight /Kg
DN15	133	139	Φ25.4	50.5	RD40X1/6	2.4
DN20	121	139	Φ32	50.5	RD48X1/6	3.5
DN25	121	139	Φ42	50.5	RD60X1/6	3.5
DN32	121	139	Φ42	50.5	RD60X1/6	3.5
DN40	106	158	Φ50.8	50.5	RD70X1/6	3.5
DN50	106	158	Φ76	64	RD98X1/6	5.3
DN65	93	158	Φ76/0102	77.5	RD98X1/6 RD125X1/6	5.3
DN80	93	158	Φ102	91/106	RD125X1/6	7.3
DN100	83.5	179	Φ122	119	RD125X1/6	8.1

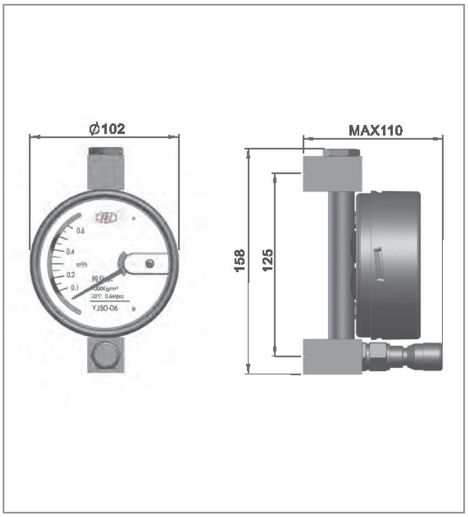
10. Overall dimensions and weight of sanitary polished pipe clamp connection type whole machine

Specification	A	B	Approx. weight /Kg
DN15	97	125	1.9
DN20	92	125	2.4
DN25	87	125	3
DN32	87	125	3
DN40	83	147	3.5
DN50	70	147	4.8
DN65	70	147	4.8
DN80	57	147	6.8
DN100	47	168	7.6



11. Overall dimensions and weight of micro-flow whole machine

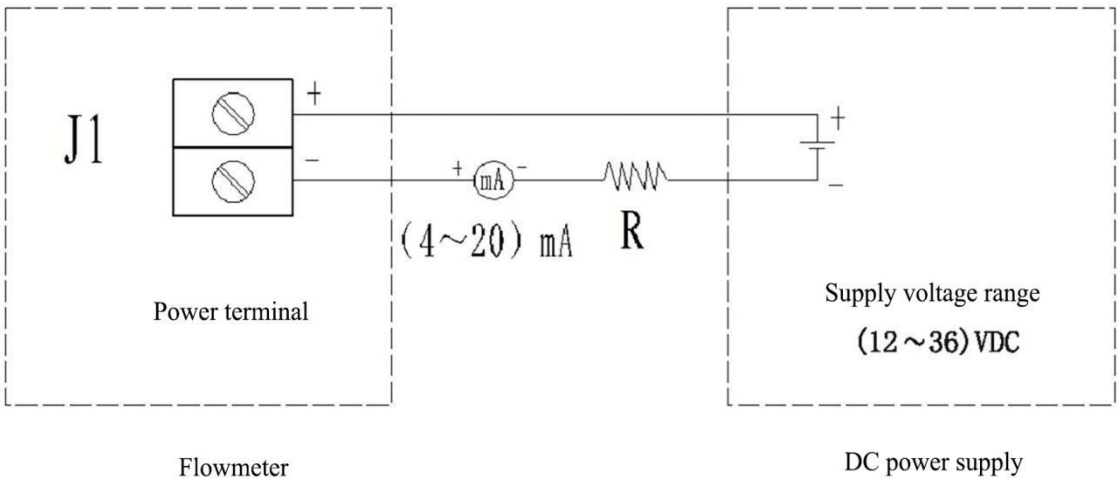
Measuring taper tube	Needle valve diameter (mm)	Approx. weight /Kg
K01	1	0.96
K02	1	0.96
K03	1	0.96
K04	1	0.96
K05	1.5	0.96
K06	1.5	0.96
K07	2.5	0.96
K08	2.5	0.96
K09	2.5	0.96
K10	4.5	0.96
K11	4.5	0.96



XII. Meter Wiring

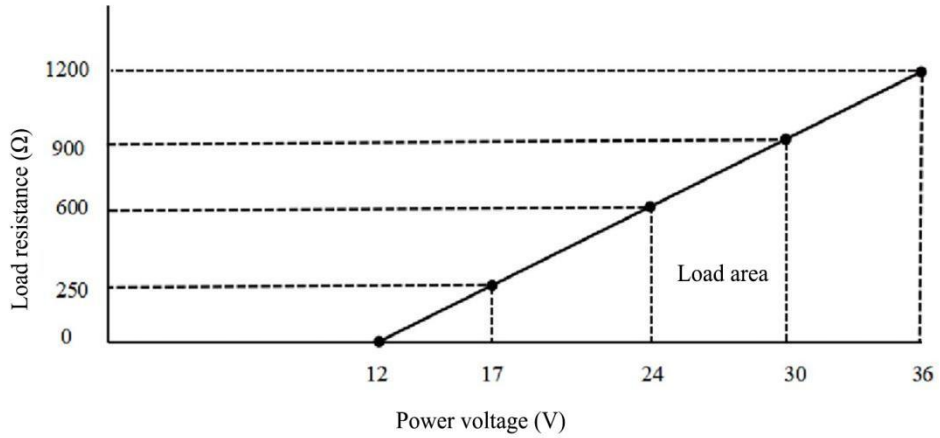
12.1 Schematic Diagram of Localized Version Wiring

1. Wiring Diagram of Two-wire System (4~20) mA Output



2. Relationship between power supply voltage and load resistance

Load resistance refers to the sum of the total resistances of power cord, controller and related equipment. If a safety barrier is used, the resistance of the safety barrier must be included.

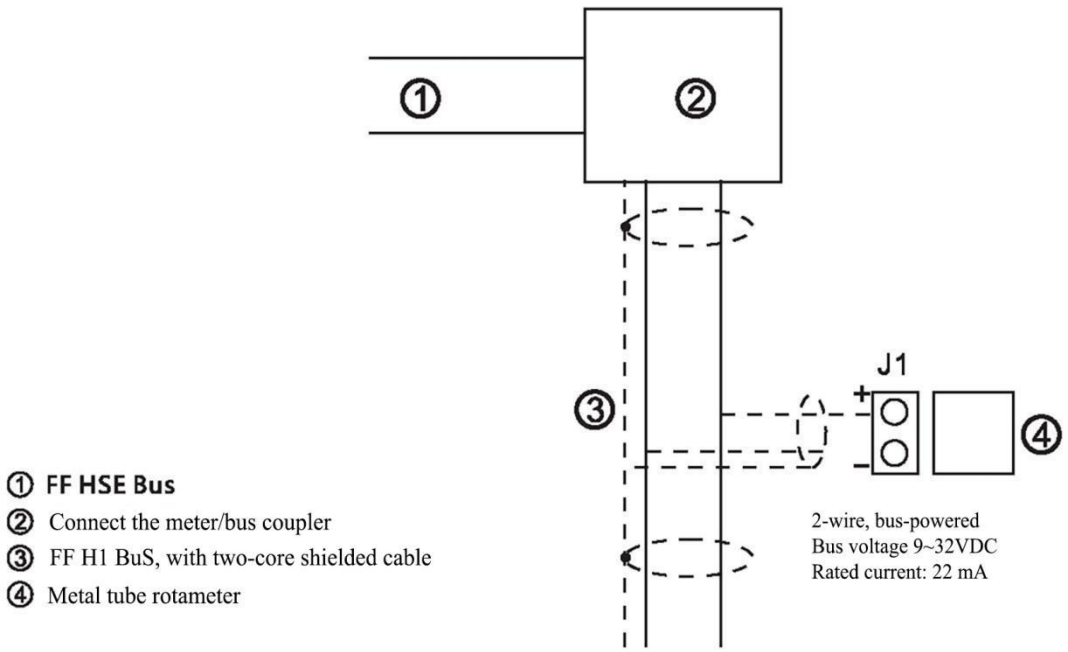


Relationship between power supply voltage and load resistance

(4~20) mA output

12.2. Schematic Diagram of Localized Version FF Bus Wiring

The metal tube rotameter is powered by a two-wire bus. The FF bus is powered by 9-32 V. It is recommended to use the special field bus cable recommended by IEC61158-2 standard. The bus cable shall not share conduit or open wire trunking with power lines of other equipment, and shall be kept away from high-power equipment. The shielded wires at both ends of FF bus are single-end grounded.



12.3. Schematic Diagram of Chinese and English LCD Wiring

1. Two-wire system (4~20) mA output wiring methods (including intrinsically safe type, Hart type and temperature and pressure compensation type):

In case of intrinsically safe explosion-proof indicator,

corresponding safety barriers shall be provided.

The explosion-proof mark of the safety barrier is Exia IIC,

The parameters shall meet the following requirements:

Ui≤28V li≤100mA

Pi≤0.7W Ci≤0.022μF

Li≤102μH

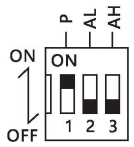
2. Multi-wire system (24VDC, 220VAC power supply, ModBus, alarm and pulse frequency output, batch processing, temperature and pressure compensation, relay alarm mode) wiring methods:

11	DC power supply	24VDC+			
12		24VDC-			
18	220VAC power supply	N			
19		L			
	OC door alarm				
31	Common GND	-/COM	31	Normally open	Lower limit
32	Pulse/frequency/batch output	+/P	32	Common terminal	
33	Lower limit alarm+	+/AL	33	Normally closed	
34	Upper limit alarm+	+/AH	34	Normally open	Upper limit
35			35	Common terminal	
36			36	Normally closed	
51	ModBus protocol output	B			
52		A			
71	Current output	+			
72		-			

*Note: When the relay alarm output is selected, there is no pulse, frequency or batch output.

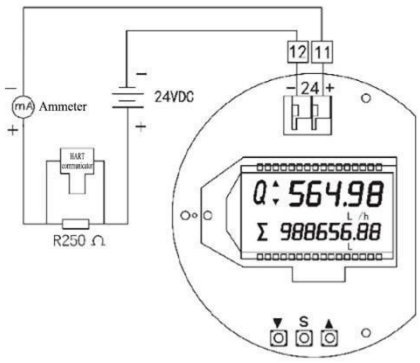
Sensor	Pressure sensor				Temperature sensor	
Terminal number	23	24	25	26	21	22
Color code	OUT 0+ red	OUT 0- blue	Power supply S- yellow	Power supply S+ black	PT1000	PT1000

*Note: Pulse, frequency, batch output and alarm output terminals are multiplex terminals, and the corresponding output modes need to be set by software. Active output or passive output is selected by the corresponding DIP switch for three-way output. The DIP switch is placed at ON end for active output, which is powered internally by the flowmeter. The internal power supply is 8mA@24VDC, and can be externally connected with electronic counter, PLC or DCS; the DIP switch is placed at OFF end for passive output, which needs to be externally connected with 5~30VDC power supply. The maximum power supply is 200mA@30VDC. When using inductive load, flywheel diode shall be added as shown in the figure. Relay alarm output has no DIP switch, pulse, frequency and batch output.

External power supply of flowmeter The positive terminal of external power supply shall be connected to load, pulse, batch and alarm passive output wiring (DIP switch is OFF)	**Internal power supply of flowmeter** Pulse, batch and alarm active output wiring (DIP switch is ON)
 **DIP switch setting (no relay output)** ON: Internal power supply of 24VDC OFF: External power supply of 5-30VDC is required DIP switch No.1 corresponds to the pulse output terminal No. 2 corresponds to the lower limit alarm terminal No. 3 corresponds to the upper limit alarm terminal	Relay alarm wiring

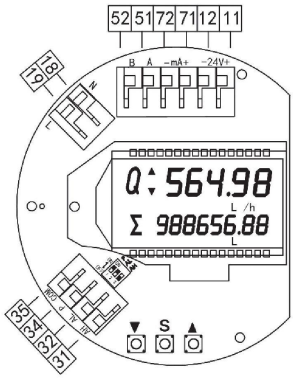
12.4. Schematic Diagram of English LCD Wiring

1. Two-wire system (4~20) mA output wiring method



11	DC power supply	24VDC+
12		24VDC-
18	220VAC power supply	N
19		L
31	Upper limit alarm/pulse output/batch output	+
32	Lower limit alarm/pulse output/batch output	+
34	Pulse/batch output	+
35	Alarm/pulse/batch output common GND	-
51	ModBus protocol output	A
52		B
71	Multi-wire system current output	+
72		-

2. Multi-wire system (24VDC, 220VAC power supply, ModBus, alarm and pulse output, batch processing mode) connection method:



The intrinsically safe explosion-proof indicator shall be selected with corresponding safety barrier, and the explosion-proof mark of safety barrier is Ex ia IIC.

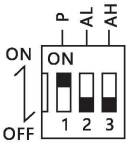
The intrinsically safe parameters of this indicator are as follows:

Ui≤28V li≤100mA

Pi≤0.7W Ci≤0.022μF

Li≤102μH

*Note: Pulse output, batch output and alarm output terminals are multiplex terminals, and the corresponding output modes need to be set by software. The three outputs are selected as active output or passive output by the corresponding DIP switch, and the DIP switch is ON for the active output, which is internally powered by the flowmeter. The internal power supply is 8mA@24VDC, which can be externally connected with an electronic counter, PLC and DCS. The DIP switch is OFF for the passive output, which requires an external power supply of 5~30VDC, and the maximum power supply is 200mA@30VDC. When the inductive load is used, a freewheeling diode should be added as shown in the figure.



DIP switch setting

ON: Internal power supply of 24VDC

OFF: External power supply of 5-30VDC is required

DIP switch No.1 corresponds to the pulse output terminal

No. 2 corresponds to the lower limit alarm terminal

No. 3 corresponds to the upper limit alarm terminal

External power supply

The positive terminal of external power supply shall be connected to load, pulse, batch and alarm passive output wiring (DIP switch is OFF)

Internal power supply

Pulse, batch and alarm active output wiring (DIP switch is ON)

12.5. Setting and Wiring Method of Local Alarm NAMUR Switch Alarm Point

1. Alarm setting

♦ First, open the cover and loosen the fixing screw ③ through the auxiliary hole on the dial.

♦ Move the upper limit alarm pointer ① and lower limit alarm pointer ② to the set alarm scale through the narrow slot on the dial.

♦ Tighten the screw ③ to fix the position of the alarm pointer, and reinstall the cover.

2. SB3.5-E2 Wiring Instructions and Technical Parameters (Three-wire)

SB3.5-E2 Wiring Instructions (Three Wires)

The load is a drivable DC component or device. For example, 24V DC relay; when automatic control parts such as flowmeter are used in non-explosion-proof places, this switch can be directly installed to cooperate with DCS or PLC.

Technical parameters of proximity switch sensor	
Proximity switch	SB3.5-E2
Switch function	PNP normally open, PNP normally closed
Operating voltage	10-30VDC
No-load consumption current	≤15mA
Minimum voltage at output terminal	8V
Output voltage range of output terminal	UB-3V
Operating current of output terminal	0-100mA
Ambient temperature	-15~80°C
On-state no-load current (metal strip away from gap)	≤15mA
Off-state no-load current (metal strip into gap)	≤5mA
IP rating	IP67

3. SC3.5-NO-Y Wiring Instructions and Technical Parameters (Two-wire)

Technical parameters of proximity switch sensor	
Proximity switch	SC3,5-No-Y
Rated voltage Us	8VDC
Power consumption effective area ON	≥23mA
Power consumption effective area OFF	≤1 mA
Ambient temperature for switch operating	-25~ + 100°C
IP rating	IP67

SC3,5-No-Y for use in hazardous locations!

Only for parallel use with intrinsically safe circuits having the following peak values:

Open-circuit voltage (U0) 15.5V Self-inductance (Li) 150μH

Short-circuit current (IK) 52mA Self-capacitance (Ci) 150nF

Output power (P) 169mW

Requirements for connecting cables when used in the intrinsically safe explosion-proof testing system:

Allowable cable resistance (double-wire) range: 0-100Ω

Introduced noise level ≤ ±1V

The resistance to ground is greater than 100kΩ.

① Lower limit alarm pointer ② Upper limit alarm pointer ③ Sector pointer

The sector plate on the sector pointer rotates in or out of the proximity switch groove to trigger the system alarm.

④ Lower limit alarm refers to the proximity switch ⑤ Upper limit alarm refers to the proximity switch

XIII. Meter Commissioning

13.1. Parameter Setting

1. Description of key functions:

Three keys are used for interface display, parameter switching and modification, as shown in Fig. 1:

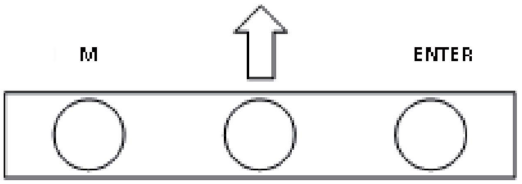


Fig. 1 Schematic Diagram of Keys

Description of key functions:

• M key is used for main display interface switching, horizontal movement of parameter items and parameter shift;

• ↑ key is used for vertical movement of parameter item and increment of parameter bit;

•ENTER key is used for enter parameter modification interface and parameter modification confirmation.

2. Main display interface

The main display interface after power-on is shown in Figure 2.

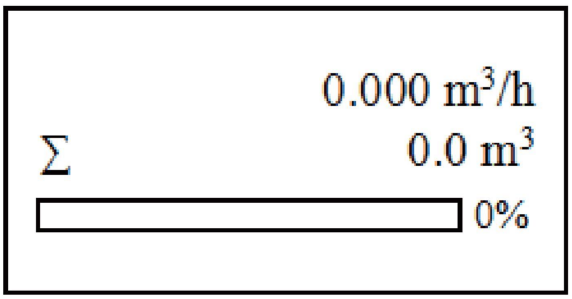


Fig. 2 Main Display Interface

The current instantaneous flow value of the meter is displayed in the first line of the main display interface, and the cumulative total value of the meter is displayed in the second line. When the total amount exceeds 100000000.0, the total amount will be reset. The third line shows the flow percentage, indicating the percentage of the current instantaneous flow to the full range. Press the M key or ↑ key in the main display interface to switch the interface among the total value display (∑), login interface (Prs Enter), flow velocity value display (Velocity), real-time angle value (Angle Val) and software version number (VISION(S)). When an alarm signal occurs, the third line of the main interface will display the current alarm information. Table 1 shows the alarm characters and descriptions.

Table 1. Description of Alarm Characters

Alarm symbol	Alarm description
ALM FLASH	Give an alarm when FLASH abnormality is detected
ALM RAM	Give an alarm when RAM abnormality is detected
ALM EEPROM	Give an alarm when the external memory abnormality is detected
ALM RNGHI	Give an alarm when the instantaneous flow is detected to be higher than the upper range limit.
ALM RNGLO	Give an alarm when the instantaneous flow is lower than the lower range limit

3. Login interface

Press the M key on the main interface to switch to the login interface, as shown in Fig. 3.

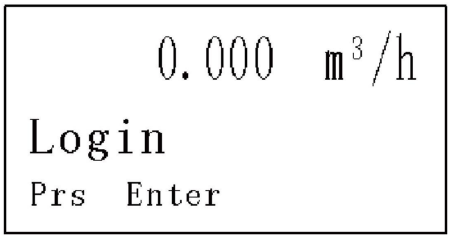


Fig. 3. Login Interface

Press the ENTER key on the login interface to enter the password entry interface, as shown in Fig. 4.

The current login password can be modified by pressing the M key and ↑ key. The M key is used to shift the password, and ↑ key is used to increase the current digit. After entering the five digits of password 04121 correctly, press the ENTER key to enter the parameter display interface.

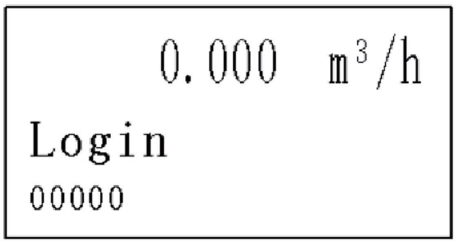


Fig. 4 Password Entry Interface

4. Parameter modification interface

The instantaneous flow value of the meter is displayed in the first line, the parameter identifier is displayed in the second line and the parameter value corresponding to the current parameter identifier is displayed in the third line on the parameter display interface. Under the parameter display interface, the M key is used to move the parameter item horizontally, and the ↑ key is used to move the parameter item vertically. Press the ENTER key to enter the parameter modification interface.

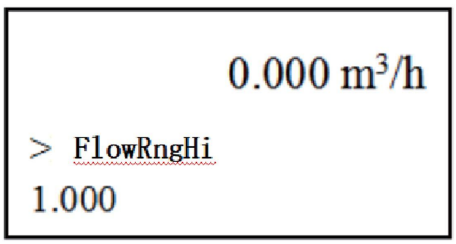


Fig. 3 Parameter Display Interface

In the parameter display interface, when there is no key operation for 5 minutes, the display will automatically switch to the main interface. The parameter list is shown in Table 2. Press the ENTER key to enter the parameter modification interface. At this time, the M key is used to shift the parameter value, and ↑ key is used to increase the currently flashing digit value. After the modification is completed, press the ENTER key to write the modified parameters and save them in an external memory.

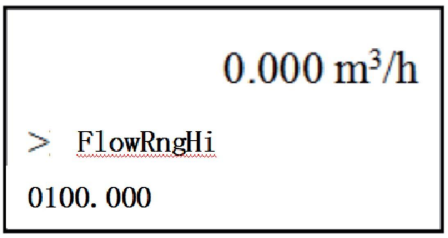


Fig. 4 Parameter Modification Interface

5. Parameter list

Table 2. Parameter List

→ M key

Flow menu	Total menu	Sensor coefficient menu	Medium working condition Menu	Frequency menu	Test menu	Other parameters
FlowRngHi	Tot Unit	Snsr Size	LiqOrGas	Pls Fact	Test Mode	PARBACKUP
FlowRngLo	Tot ClrEn	StdFVel0	BuoyDensi	Pls Max	Test Flow	SysRunSta
Flow Unit	TotNet L	MeaFVel0	Watr20Den	OutFreq	Test %	ROM CHECK
PVmA Fsd	TotNet F	StdFVel1	LiqDensy		Test Vel	Disp Res
PVmA Zero	Tot Over	MeaFVel1	WorkTemp		Angle Val	FactRst
Flow Rsp		StdFVel2	WorkPress		Test Alm	
Flow Cut		MeaFVel2	StdGasDen		Temp deg	
zeroAngle		StdFVel3	StdTemp			
		MeaFVel3	Std Press			
		StdFVel4	StdAirDen			
		MeaFVel4	Gas LiqCvR			
		StdFVel5				
		MeaFVel5				
		StdFVel6				
		MeaFVel6				
		StdFVel7				
		MeaFVel7				
		StdFVel8				
		MeaFVel8				
		StdFVel9				
		MeaFVel9				
		StdFVel10				
		MeaFVel10				
		DevID				

6. Parameter definition:

Flow menu	
FlowRngHi	Upper range limit (default: 10)
FlowRngLo	Lower range limit (default: 0)
Flow Unit	Flow unit (please refer to "Description of Flow Units" for details); the default unit is m^3/h.
PVmA Fsd	Full-scale current correction value (default: 0)
PVmA Zero	Zero current correction value (default: 0)
Flow Rsp	Damping (s); 3.2 by default
Flow Cut	Small signal cutoff (mm/s)
zeroAngle	Angle value corresponding to zero flow, -45 by default
Total menu	
Tot Unit	Total unit (m^3 by default), (please refer to "Description of Total Unit" for details)
Tot ClrEn	Total reset enable
TotNet L	Integer part of total value
TotNet F	Decimal part of total value
Tot Over	Total overflow
Sensor coefficient menu	
Snsr Size	Caliber (m); (default: 0.08)
StdFVel0	Standard meter flow velocity at point 0 (default: 1)
MeaFVel0	The LCD angle value of the calibrated meter at point 0 (default: 0)
StdFVel1	Standard meter flow velocity at point 1 (default: 0)
MeaFVel1	The LCD display angle value of the calibrated meter at point 1 (default: 0)
StdFVel2	Standard meter flow velocity at point 2 (default: 0)
MeaFVel2	The LCD display angle value of the calibrated meter at point 2 (default: 0)
StdFVel3	Standard meter flow velocity at point 3 (default: 0)
MeaFVel3	The LCD display angle value of the calibrated meter at point 3 (default: 0)
StdFVel4	Standard meter flow velocity at point 4 (default: 0)
MeaFVel4	The LCD display angle value of the calibrated meter at point 4 (default: 0)
StdFVel5	Standard meter flow velocity at point 5 (default: 0)
MeaFVel5	The LCD display angle value of the meter calibrated at point 5 (default: 0)
StdFVel6	Standard meter flow velocity at point 6 (default: 0)
MeaFVel6	The LCD display angle value of the calibrated meter at point 6 (default: 0)
StdFVel7	Standard meter flow velocity at point 7 (default: 0)
MeaFVel7	The LCD display angle value of the meter calibrated at point 7 (default: 0)

StdFVel8	Standard meter flow velocity of point 8 (default: 0)
MeaFVel8	The LCD display angle value of the meter calibrated at point 8 (default: 0)
StdFVel9	Standard meter flow velocity of point 9 (default: 0)
MeaFVel9	The LCD display angle value of the meter calibrated at point 9 (default: 0)
StdFVel10	Standard meter flow velocity of point 10 (default: 0)
MeaFVel10	The LCD display angle value of the meter calibrated at point 10 (default: 0)
DevID	Meter No.
Medium working condition menu	
LiqOrGas	Liquid or gas switching, (default: 0 indicates liquid calibration medium; 1 indicates gas calibration medium)
BuoyDensi	Float component density (default: 7800 kg/m^3)
Watr20Den	Calibrated water density (default: 998.2 kg/m^3)
LiqDensy	Liquid (or vapor) density (default: 998.2 kg/m^3)
WorkTemp	Celsius temperature of measured medium (default: 20°C)
WorkPress	Pressure of measured medium (default: 0 kPa)
StdGasDen	Density of measured gas under standard condition (default: 1.205 kg/m^3)
StdTemp	Celsius temperature of air under standard condition (default: 20°C)
StdPress	Air pressure under standard condition (default: 101.325 kPa)
StdAirDen	Air density under standard condition (default: 1.205 kg/m^3)
Gas LiqCvR	Conversion coefficient of gas medium during water calibration (default: 1). When the medium is gas, it is equal to the water flow value during working condition flow (or standard condition flow) calibration.
Frequency menu	
Pls Fact	Number of pulses generated by flow per unit volume (default: 0)
Pls Max	Upper limit of output pulse frequency (Hz); (default: 800 Hz)
OutFreq	Real-time output pulse frequency (Hz)
Test menu	
Test Mode	Test mode enable 1: A flow can be simulated to calibrate the meter: 4: Meter output 4 mA; 20: Meter output 20 mA; 11: The meter enters the automatic zero setting mode, and the zero setting time is 20s.
Test Flow	Test mode flow size setting
Test%	Range percentage display
Test Vel	Flow velocity output display (m/s)

Angle Val	Real-time angle value
Test Alm	System alarm
Temp deg	Mainboard temperature (°C)
Other parameters	
PARBACKUP	Parameter backup to external memory
SysRunSta	System operating state
ROM CHECK	ROM check code
Disp Res	Number of decimal digits (default: 3)
FactRst	Parameter reset

7. Description of flow unit

L/s	Liter/second	NL/m	Normal liter/minute	kg/s	Kilogram/second
L/m	Liter/minute	NL/h	Normal liter/hour	kg/m	Kilogram/minute
L/h	Liter/hour	Nm3/m	Normal m^3/minute	kg/h	Kilogram/hour
m3/s	Normal m^3/second	Nm3/h	Normal m^3/hour	kg/d	Kilogram/day
m3/m	m^3/minute	g/s	Gram/second	t/m	Ton/minute
m3/h	m^3/hour	g/m	Gram/minute	t/h	Ton/hour
m3/d	m^3/day	g/h	Gram/hour	t/d	Ton/day

8. Description of total unit

L	Liter	g	Gram
m3	m^3	kg	Kilogram
NL	Normal liter	t	Ton
Nm3	Normal m^3		

9. Parameter setting of fold line

Standard meter flow velocity at point X	StdFVel0	StdFVel1	StdFVel2	.....	StdFVel8	StdFVel9	StdFVel10
The LCD angle value of the meter calibrated at point X	MeaFVel0	MeaFVel1	MeaFVel2	.....	MeaFVel8	MeaFVel9	MeaFVel10

Flow point: large →► small

Correction shall be carried out from the large to small, with a maximum of ten sections.

10. Zero setting

When the metal tube rotameter is installed on the pipeline, automatic zero setting or manual zero setting can be carried out when there is no flow in the pipeline and the pointer on the panel is at the position of zero flow and the meter displays a flow.

(1) The automatic zero setting steps are as follows:

Step I: Enter the password (04121) to access the first line of column 6 in menu mode (Test Mode);

Step II: Press the "ENTER" key to enter the modification mode, modify the value of parameter Test Mode to 11, and the meter enters the automatic zero setting mode with a zero setting time of 20s.

(2) The manual zero setting steps are as follows:

Step I: Press the M key in the main display interface to view and record the value of parameter Angle Val;

Step II: Enter the password (04121) to access the 6th line of column 1 (zeroAngle) in menu mode, and record the current zeroAngle value. The value of Angle Vall + the value of current zeroAngle = the value of parameter zeroAngle that needs to be reset;

Step III: Press the "ENTER" key to enter the modification mode interface, enter the value that needs to reset the parameter zeroAngle, and press the "ENTER" key.

13.2. Chinese and English LCD commissioning instructions

1. Indicator software commissioning.

2. Setting and operation of indicator communication parameters with Hart protocol:

If the meter needs to communicate with the upper computer, corresponding parameters shall be set before communication. The parameter settings are shown in Table 2.

■ Keys operation

3. Setting and operation of indicator communication parameters with ModBus protocol:

If the meter needs to communicate with the upper computer, corresponding parameters shall be set before communication. The parameter settings are shown in Table 3.

■ Keys operation

If the meter needs to communicate with configuration software such as Kingview, see Table 1 for variable names and addresses.

Version No.: ModBus-RCP520V-1.0ModBus communication No.4 command, read input register with high byte first				
Variable register address description	Decimal address	Hexadecimal address	Data format	Format description
Instantaneous current under working condition	31001	0x03E8	Float	4-byte floating point type
Instantaneous percentage under working condition	31003	0x03EA		
Instantaneous flow under working condition	31005	0x03EC		
Cumulative flow in working condition	31007	0x03EE		
Unit of instantaneous and cumulative flow under working condition	31009	0x03F0	Long	4-byte integer
Instantaneous flow velocity under working condition	31011	0x03F2	Float	4-byte floating point type
Temperature under working condition	31013	0x03F4		
Pressure under working condition	31015	0x03F6		
Alarm	31017	0x03F8	Long	4-byte integer
Instantaneous current under standard condition	31019	0x03FA	Float	4-byte floating point type
Instantaneous percentage under standard condition	31021	0x03FC		
Instantaneous flow under standard condition	31023	0x03FE		
Cumulative under standard condition	31025	0x0400		
Unit of instantaneous and cumulative flow under standard condition	31027	0x0402	Long	4-byte integer
Instantaneous flow velocity under standard condition	31029	0x0404	Float	4-byte floating point type
Temperature under standard condition	31031	0x0406		
Pressure under standard condition	31033	0x0408		
Upper engineering limit	31035	0x040A		
Lower engineering limit	31037	0x040C		
PA address	39501	0x251C	Long	4-byte integer

Table 1

*"3" before the decimal address "31001" is No. 4 command of Kingview, and "1001" behind it is the actual address of variable register

13.3 . English LCD commissioning instructions

1. Indicator software commissioning.

2. Setting and operation of indicator communication parameters with Hart protocol:

If the meter needs to communicate with the upper computer, corresponding parameters shall be set before communication. The parameter settings are shown in Table 2.

■ Keys operation

3. Setting and operation of indicator communication parameters with ModBus protocol:

If the meter needs to communicate with the upper computer, corresponding parameters shall be set before communication. The parameter settings are shown in Table 3.

■ Keys operation

If the meter needs to communicate with configuration software such as Kingview, see Table 4 for variable names and addresses.

Communication baud rate	1200
Data length	8
Stop length	1
Odd/even check	N/A
Equipment address range	0 to 15
Communication mode	Hart

Table 2

Communication baud rate	1200-38400
Data length	8
Stop length	1
Odd/even check	N/A
Equipment address range	1 to 99
Communication mode	RS485

Table 3

Version No.: ModBus-RCP516V-2.0ModBus communication No.4 command, read input register with high byte first					
Variable name	Decimal address	Hexadecimal address	Data format	Format description	Description
Instantaneous flow	31001	0x03E8	Float	4-byte floating point type	
Cumulative flow	31003	0x03EA	Float	4-byte floating point type	
Instantaneous flow unit	31005	0x03EC	Short	2-byte integer	Low byte
Cumulative flow unit	31006	0x03ED	Short	2-byte integer	High byte
Instantaneous current	31007	0x03EE	Float	4-byte floating point type	
Instantaneous percentage	31009	0x03F1	Float	4-byte floating point type	
Instantaneous flow velocity	31011	0x03F3	Float	4-byte floating point type	

Table 4

*"3" before the decimal address "31001" is No. 4 command of Kingview, and "1001" behind it is the actual address of variable register

XIV. Key Functions and Parameter Settings

♦ Press the (▲) key for 5s to enter settings;

♦ Press the (▼) key to page up (previous menu), and press the S (SET) key to page down (next menu) to view parameters;

♦ Press and hold the (▼) key for 3s to enter the current menu settings;

♦ Press (▼) key to modify the data and press S (SET) key for shifting;

♦ After entering, press and hold the (▼) key for 3s to save the settings; or press the (▲) key to cancel the modification and return to the previous menu.

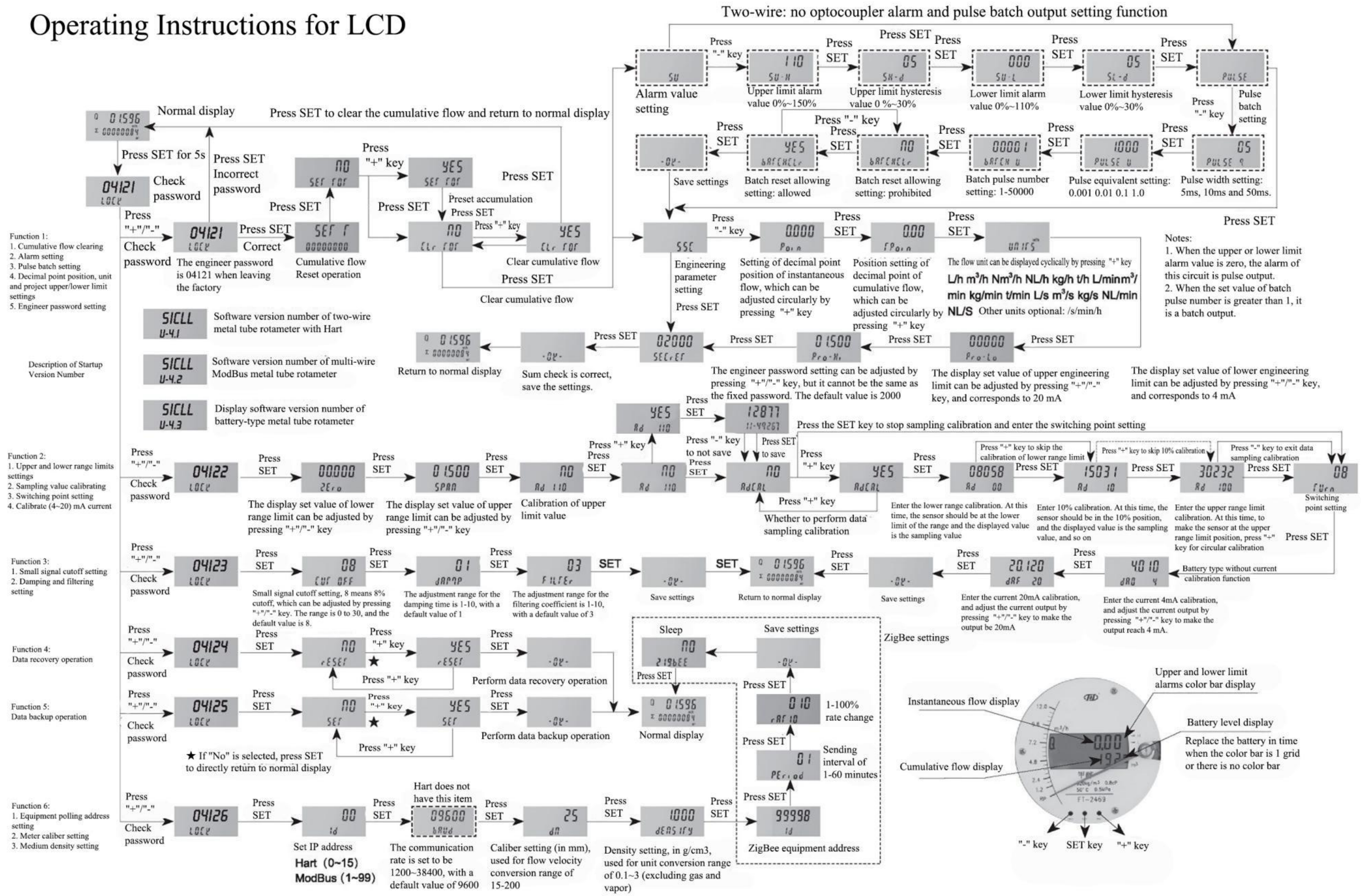
Primary menu	Password	Secondary menu	Tertiary menu	Display range	Default value
Basic parameters	04121	Language selection		English/Chinese	Chinese
		Contrast ratio		1-5 cycles	1
		Write protection		OFF/ON	OFF
		Meter caliber		10-200	25
		Instantaneous flow unit		L, m3, NL, Nm3, kg, t/(h/min/s)	m3/h
		Instantaneous number of decimal places		0-3 cycles	1
		Upper engineering limit		0-99999	10
		Lower engineering limit		0-99999	0
		Damping (S)		1-10	1
		Correction coefficient		1.000-2.000	1.000
		Small flow cutoff (%)		0-30.0	8.0
		Cumulative flow reset	Density (g/cm^3)	0.4-15.000	1.000
			Density (kg/m^3)	0.01-99.999	1.205
		Density (liquid or gas)		No/Yes	No
		Cumulative flow presetting		0000.000-9999 999	00000000
		Cumulative overflow times		0-99999	00000
		Password settings		0-99999	00000
Output parameters	04122	Communication settings	Communication category	Hart/ModBus/4-20mA	Hart/ModBus
			Communication address	0-15/1-99	0/1
			Communication rate	1200-38400	1200/9600
		Alarm output setting and PA address setting	Upper alarm limit (%)	0-200	200.000
			Upper alarm limit hysteresis (%)	0-20	5.0
			Lower alarm limit (%)	-100-199	-100.000
			Lower alarm limit hysteresis (%)	0-20	5.0
			Stuck threshold	1-1000	10

			PA address	0-126	000
		Pulse output	Pulse width (ms)	5、10、50	50
			Pulse equivalent	0.001、0.01、0.1、1	1.000
		Batch output	Batch pulse number	1-99999	00001
			Batch reset allowing	No/Yes	No
		Frequency output	Frequency output	0~2000Hz	2000Hz
		No output	No output	-	-

Primary menu	Password	Secondary menu	Tertiary menu	Display range	Default value
Calibration parameters	04123	Flow calibration setting (Long press ▼ to enter, press S key to select point, then long press ▼ to enter the modification interface, and long press ▼ to save or press ▲ to exit)	Flow direction	Bottom-in and top-out/top-in and bottom-out	Bottom-in and top-out
			Medium type	Liquid/gas	Liquid
			Upper range limit	00.000~99999m3/h	10.000m3/h
			Lower range limit	00.000~99999m3/h	0.000m3/h
			Flow calibration	Flow calibration point 00	Press S to save
				Flow input value	Long press ▼ to enter the manual input of flow value
					Long press ▼ to save
			Current calibration	Enter current calibration	Long press ▼ to enter
				4 mA calibration	Press ▼ to decrease
				20 mA calibration	Press S to increase
		Temperature and pressure compensation setting	Compensation mode	No compensation	No compensation *Under development
				Gas volume	
				Gas mass	
				*Vapor volume	
				*Steam quality (PT)	
				*Saturated steam quality (T)	
				*Saturated steam quality (P)	
			Preset operating pressure	-200.000kPa ~4000.00kPa	101.300kPa
			Preset operating temperature	-50°C~450°C	20.000°C
			Temperature acquisition method	Automatic/manual acquisition	Automatic acquisition
			Pressure acquisition mode	Automatic/manual acquisition	Automatic acquisition
			Minimum pressure value	-200kPa~400kPa	-10.000kPa
			Minimum temperature value	-50°C~450°C	-50°C
			Temperature low point calibration	000.000Ω	1000.00Ω
			Temperature high point calibration	2000.000Ω	2000.00Ω
			Pressure zero calibration	+000.000 kPa	0.000 kPa
			Pressure full-point calibration	+4000.00 kPa	4000.000 kPa
			Small pressure cut-off value	-200kPa~400kPa	3.000kPa
			Migration of pressure at any point	-200kPa~400kPa	0000.000 kPa
			Standard gas temperature	0/15/20°C	20°C

			Selection of gauge pressure and absolute pressure	Absolute/gauge pressure	Gauge pressure
Data processing	04124	Data backup	Data backup	No/Yes	No
	04125	Data recovery	Data recovery	No/Yes	No
Display configuration	S key	Main display content	Instantaneous flow under working condition	Oper.Flow	Oper.Flow
			Instantaneous flow under standard condition	Std.Flow	
			Flow velocity	Flow rate	
			Flow percentage	Percent	
	▲ key	First line of auxiliary display	Cumulative flow	Σ： 9999 999m3	Σ： 9999 999m3
			Flow percentage	Per: 0.000%	
			Flow velocity	Rate: 0.000m/s	
	▼ key	Second line of auxiliary display	Current	Curr: 4.000mA	Curr:4.000mA
			Density	Den. 1.293kg/m3	
			Pressure	P: 000.000kPa	
			Temperature	T: 000.0°C	
			Temperature + pressure	T:000.0°CP:000.000kPa	

Operating Instructions for LCD



XV. Analysis and Handling of Faults

1 5.1. Shaking

1. Slight shaking: It is generally caused by medium fluctuation. It can be solved by adding buffer devices or lengthening the straight pipe section.

2. Moderate shaking: It is generally caused by the flow state of medium. For gas, it is generally caused by unstable operating pressure of medium. It can be solved by using a voltage-stabilizing or current-stabilizing rectifier or increased meter air damping.

3. Severe shaking: It is mainly caused by medium pulsation, unstable air pressure or no back pressure at the outlet of flowmeter. Voltage-stabilizing, current-stabilizing or buffer device can be adopted to increase the back pressure at the outlet of meter.

15.2. Pointer stops at a certain position and does not move

The main reason is that the float gets stuck.

1. Generally, if the valve is opened too fast when the meter is in use, the float will quickly impact the guider upwards, resulting in deformation of the guider and jamming of the float. However, it is not excluded that the float will be stuck due to misalignment between the guide rod and the guider. During handling, the meter can be removed. The deformed guider shall be taken down for shaping and checked whether it is concentric with the guide rod. If not, correction can be made. Then, the float shall be installed and pushed by hand to feel that the float is smooth up and down without jamming. In addition, the meter must be installed vertically or horizontally without tilting, otherwise it will easily cause meter stagnation and measurement errors.

2. If the float is stuck by impurities in the measuring tube, remove the impurities.

15.3. The valve is opened and the meter pointer reaches the maximum value

The main reason is that the range of the meter is too small, so it shall be increased.

15.4 Large measurement error

1. The installation does not meet the requirements

■ For vertically installed meters, they shall be kept vertical, and the inclination angle shall not be more than 2°.

■ For horizontally installed meters, they shall be kept level and the inclination angle shall not be more than 2°.

■ There shall be no ferromagnetic objects within a radius of 100 mm around the meter.

■ The installation position shall be far away from the valve reducer, pump outlet, process pipeline bend, etc. The requirement of 250mm straight pipe section after the front 5D shall be maintained.

2. The great change in density of liquid medium is also a reason for large errors. Before calibration of the meter, the medium is converted according to the density given by the user into the flow of water in the calibration state for calibration. Therefore, if the medium density changes greatly, great errors will be caused to the measurement. The solution is to bring the changed medium density into the formula, convert it into an error correction coefficient, and then multiply the flow measured by the flowmeter by the coefficient and convert it into a real flow.

3.As the gas medium is greatly affected by temperature and pressure, it is recommended to use temperature-pressure compensation to obtain the real flow.

4. Due to long-term use, pipeline vibration and other factors, the moving parts such as sensing magnetic steel, pointer, counterweight and rotating magnetic steel of meters are loose, resulting in large errors. Solution: It can be verified by pushing the floater by hand. First, observe whether the pointer is in the RP position. If it is in the RP position, check whether the output is 4 mA and whether the flow display is 0, and then push the floater in turn to make the pointer point to the corresponding scale for verification. If inconsistency is found, the component can be repositioned. It is generally required to be adjusted by professionals, otherwise it will cause position loss and need to be returned to the manufacturer for correction.

5.

For liquid measurement, if the flow displayed is larger than the actual flow, it is mostly caused by high viscosity of liquid. If the accurate liquid viscosity is not provided when ordering, it needs to be returned to the factory for viscosity correction.

15.5 No current output

1. First, check whether the wiring is correct.

2. Check whether the LCD displays. If there is display but no output, it mostly indicates that the output tube is damaged and the circuit board needs to be replaced.

3. Loss of calibration value. The loss of meter calibration data due to E2PROM failure will also cause no output current, and the current will remain unchanged. Solution: Data recovery operation can be used. If it does not work, the data in the basic parameters can be set first, and then the data in the calibration setting can be set. The method is to calibrate the data from RP-100% by manually pushing the float.

15.6 No field display

1. Check whether the wiring is correct.

2. Check whether the power supply is correct.

3. Check whether the LCD is damaged or in poor contact.

15.7 Field LCD displays 0 or full scale

1. Check the lower range limit (ZERO) and upper range limit (SPAN) of calibration setting. The zero point is required to be less than the full scale value, and the two values cannot be equal.

2. Check whether the sampling data comes up, and push the pointer by hand to see the change of the sampling value. If there is no change, it is generally a fault in the sampling circuit of the circuit board, which needs to be replaced.

15.8 Incorrect alarm:

1. Check that the hysteresis values of upper and lower limits for alarm cannot be too large.

2. Check the alarm value setting.

3. The circuit board is faulty and needs to be replaced.

4. Check the wiring;

15.9 Incorrect cumulative pulse output:

1. Check whether the pulse width is set correctly. The maximum output frequency of pulse shall be less than the maximum frequency corresponding to the set pulse width, as shown in Table 5.

Pulse width setting	Pulse setting			
	0.001	0.01	0.1	1
5ms	360/h	3600/h	36000/h	99999/h
10ms	180/h	1800/h	18000/h	180000/h
50ms	36/h	360/h	3600/h	36000/h

Table 5

* Under different pulse widths and pulse equivalents, the maximum range shall be less than the corresponding flow per hour in the table.

2. The circuit board is faulty and needs to be replaced.

15.10. Field LCD is inconsistent with the value displayed on PLC and DCS:

1. Check whether the 4~20mA output is calibrated.

2. Whether the range set on PLC and DCS is consistent with the upper and lower engineering limits of flowmeter.

XVI. Product Accessories

16.1 Straight pipe section

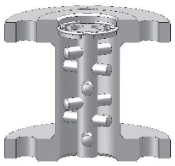
Users can choose the straight pipe section with the first 5D (the nominal diameter of the pipeline) and the straight pipe section with the last 250mm to be installed with the flowmeter to ensure the measuring accuracy of the meter.

16.2. Companion flange, fastener and sealing gasket

Companion flanges, fasteners and gaskets can be provided according to the selected flowmeter flange standards (GB, HG, JB, ANSI, DIN, JIS).

16.3. Magnetic filter

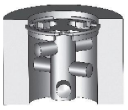
When the medium contains ferromagnetic impurities or the flowmeter is installed and used for the first time, it is recommended to choose the magnetic filter. Magnetic filter can be made of stainless steel and lined with PTFE. Flange connection, clamping type and integrated type can be selected according to connection method. Special structure can be customized according to user's requirements.



Type C - Flange connection

Total length 100mm

(Caliber >DN100, total length 150mm)



Type S-Clamped connection

Total length 50mm (≤DN100)

16.4. Battery

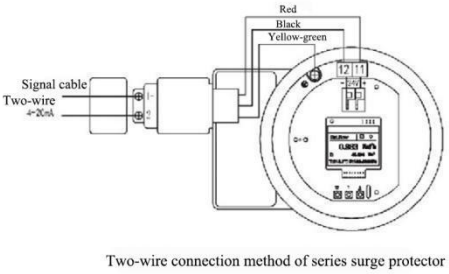
CP5BAT-9AH ATT5-B battery can be provided when the battery flowmeter has insufficient power.

16.5. ModBus and Hart protocol modem and upper computer software

ModBus and Hart protocol modem and upper computer software can communicate and be debugged with field meters through computers. CP58M-1 and CP58H-1 modems need to be ordered, with optional accessory ATT5-T.

16.6. Description of Two-wire System Wiring Method and Connection Dimensions of Series Surge Protector

CP5BAT-9AH ATT5-B battery can be provided when the battery flowmeter has insufficient power.



Two-wire connection method of series surge protector



XVII. Comparison Table of Flow Range and Maximum Pressure Loss

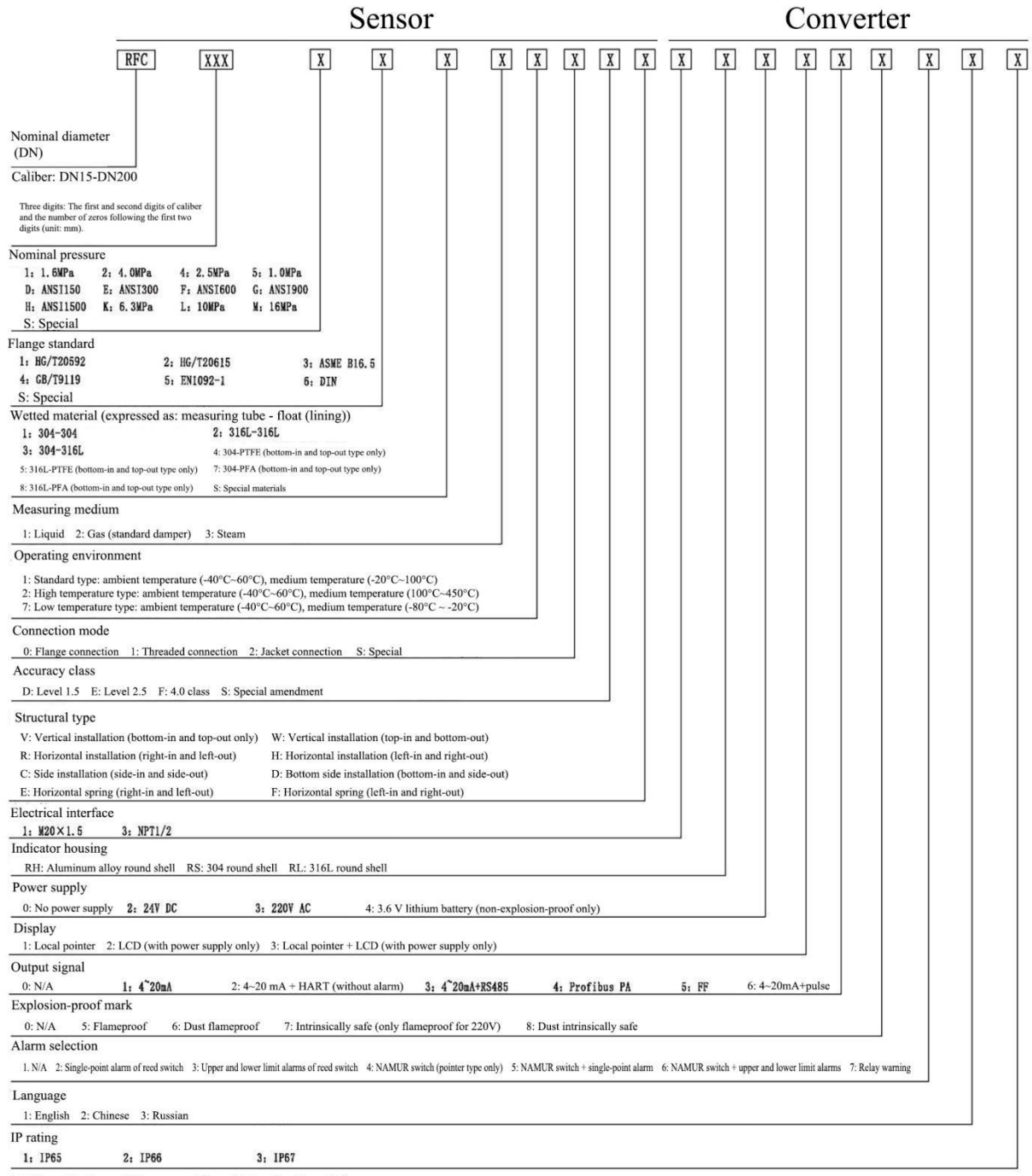
Comparison Table of Water Flow and Maximum Pressure Loss under Standard Conditions																		
Caliber	Flow section	Water flow (L/h)								Maximum pressure loss value (kPa)								
		Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection	Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection
DN15 DN20 DN25	S15.0	10	16	63	63			63	10	6.23	6.80	17.80	23.00			19.50	6.23
	S15.1	16	20	100	100	25	25	100	16	6.15	6.80	18.00	23.20	16.80	10.80	20.40	6.15
	S15.2	25	25	160	160	40	40	160	25	6.25	6.80	20.00	23.80	16.80	10.80	22.50	6.25
	S15.3	40	40	250	250	63	63	250	40	6.14	7.00	22.00	25.00	17.00	11.00	25.00	6.14
	S15.4	63	60	400	400	100	100	400	63	5.97	7.20	25.00	28.00	17.20	11.20	25.00	5.97
	S15.5	100	100	630	630	160	160	630	100	7.32	7.80	26.00	29.00	17.80	11.80	25.50	7.32
	S15.6	160	160	1000	1000	250	250	1000	160	6.34	9.00	28.00	32.00	19.00	13.00	25.50	6.34
	S15.7	250	250	2500		400	400	2500	250	9.31	12.00	28.00		22.00	16.00	25.50	9.31
	S15.8	400	400			630	630		400	7.84	13.00			23.00	17.00		7.84
	S15.9	630				1000	1000		630	11.00				26.00	20.00		11.00
	S15.10	1000							1000	10.49							10.49
DN20	S20.0								1200								5.70
	S20.1								1600								5.63
	S20.2								2500								3.17
	S20.3								3000								6.50
DN25 DN32 DN40 DN50	S25.0	300	400	1000	630	630	630	1000	3200	4.75	3.80	9.70	19.80	13.80	7.80	11.00	6.47
	S25.1	630	630	1600	1000	1000	1000	1600	4000	4.65	4.20	9.70	2020	14.20	820	11.00	7.84
	S25.2	1000	1000	2500	1600	1600	1600	2500	5000	7.12	5.70	10.50	21.70	15.70	9.70	12.00	4.38
	S25.3	1600	1600	3200	2500	2500	2500	3200	6300	5.63	6.00	10.50	22.00	16.00	10.00	12.00	10.04
	S25.4	2500	2000	4000	3200	3200	3200	4000	8000	3.17	7.80	11.50	22.60	16.60	10.60	14.50	11.17
	S25.5	3200	2500	5000	4000	4000	4000	5000		4.10	8.80	11.50	23.80	17.80	11.80	14.50	
	S25.6	4000	3600	6300	5000	5000	5000	6300		7.84	10.30	17.20	24.80	18.80	12.80	21.70	
	S25.7	5000		10000	6300	6300	6300	10000		4.38		19.50	26.30	20.30	14.30	24.00	
	S25.8	6300								10.04							
	S25.9	8000								11.17							
DN32	S32.0								3200								6.47
	S32.1								4000								7.84
	S32.2								5000								8.80
	S32.3								6300								10.04
	S32.4								8000								11.17
DN40	S40.0								8000								11.17
	S40.1								10000								4.25
	S40.2								13000								10.50

Comparison Table of Water Flow and Maximum Pressure Loss under Standard Conditions																	
Caliber	Flow section	Water flow (L/h)								Maximum pressure loss value (kPa)							
		Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection	Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection
DN 50 DN 65 DN 80	S50.0	4000	4000	6300	4000	4000	4000	6300	5000	2.60	4.70	22.40	20.20	11.20	8.20	24.00	4.70
	S50.1	6300	6300	10000	6300	6300	6300	10000	6300	5.50	6.00	22.40	20.70	11.70	8.40	24.00	5.50
	S50.2	10000	10000	16000	10000	10000	10000	16000	10000	4.25	6.00	22.40	22.00	16.00	10.00	24.00	4.25
	S50.3	16000	14000	20000	16000	16000	16000	20000	16000	7.50	6.50	26.00	22.00	16.00	10.00	30.00	7.50
	S50.4	20000		25000		20000	20000	25000	25000	10.00		40.00		16.50	10.50	42.00	13.30
	S50.5	25000		35000				35000		13.30		40.00				44.00	
DN 65	S65.0								25000								13.30
	S65.1								30000								7.20
	S65.2								40000								8.20
	S65.3								45000								9.00
DN 80	S80.0	10000	16000	16000	16000	16000	16000	16000	30000	4.03	7.00	14.50	22.00	16.80	10.80	16.00	7.20
	S80.1	16000	25000	25000	25000	25000	25000	25000	40000	4.94	13.00	15.00	22.80	17.00	11.00	18.00	8.20
	S80.2	25000		40000	40000	40000	40000	40000	50000	6.87		21.00	23.00	23.00	17.00	23.00	13.70
	S80.3	40000		63000				63000		8.20		29.00				32.00	
	S80.4	63000								13.17							
DN 100	S100.0	40000	25000	63000	40000	40000	40000	63000	50000	6.50	6.50	27.00	22.50	16.50	10.50	24.00	6.50
	S100.1	63000	40000	80000	63000	63000	63000	80000	80000	6.50	13.00	31.50	22.50	16.50	10.50	25.00	15.00
	S100.2	80000		100000		80000	80000	100000	100000	20.00		35.00		20.00	24.00	26.00	20.00
	S100.3	100000								22.00							
DN 150	S150.0	80000			80000	80000	80000			22.00			50.00	50.00	50.00		
	S150.1	100000			100000	100000	100000			19.50			50.00	50.00	52.00		
	S150.2	150000					110000			60.00					55.00		
DN 200	S200.0	150000			140000	150000	180000			50.00			82.00	80.00	80.00		
	S200.1	200000								50.00							

Comparison Table of Air Flow Range and Maximum Pressure Loss under Standard Conditions																	
Caliber	Flow section	Air flow (m^3/h)								Maximum pressure loss value (kPa)							
		Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection	Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection
DN15 DN20 DN25	S15.0			1.80	1.80			1.80				17.80	23.00			19.50	
	S15.1	0.50		3.00	3.00	0.70	0.70	3.00	0.50	6.15		18.00	23.20	16.80	10.80	20.40	6.15
	S15.2	0.70		4.80	4.80	1.20	1.20	4.80	0.70	6.25		20.00	23.80	16.80	10.80	22.50	6.25
	S15.3	1.20		7.00	7.00	1.80	1.80	7.00	1.20	6.14		22.00	25.00	17.00	11.00	25.00	6.14
	S15.4	1.80	1.40	12.00	12.00	3.00	3.00	12.00	1.80	5.97	7.20	25.00	28.00	17.20	11.20	25.00	5.97
	S15.5	3.00	2.40	18.00	18.00	4.80	4.80	18.00	3.00	7.32	7.80	26.00	29.00	17.80	11.80	25.50	7.32
	S15.6	4.80	3.80	30.00	30.00	7.00	7.00	30.00	4.80	6.34	9.00	28.00	32.00	19.00	13.00	25.50	6.34
	S15.7	7.00	6.00	70.00		12.00	12.00	70.00	7.00	9.31	12.00	28.00		22.00	16.00	25.50	9.31
	S15.8	12.00	9.60			18.00	18.00		12.00	7.84	13.00			23.00	17.00		7.84
	S15.9	18.00				30.00	30.00		18.00	11.00				26.00	20.00		11.00
	S15.10	30.00							30.00	10.49							10.49
DN20	S20.0								36.00								5.70
	S20.1								48.00								5.63
	S20.2								75.00								3.17
	S20.3								90.00								6.50
DN25 DN32 DN40 DN50	S25.0	14.00	9.60	30.00	18.00	18.00	18.00	30.00	100.00	4.75	3.80	9.70	19.80	13.80	7.80	11.00	6.47
	S25.1	21.00	15.00	48.00	30.00	30.00	30.00	48.00	120.00	4.65	4.20	9.70	2020	14.20	820	11.00	7.84
	S25.2	30.00	24.00	70.00	48.00	48.00	48.00	70.00	150.00	7.12	5.70	10.50	21.70	15.70	9.70	12.00	4.38
	S25.3	48.00	38.00	100.00	70.00	70.00	70.00	100.00	180.00	5.63	6.00	10.50	22.00	16.00	10.00	12.00	10.04
	S25.4	70.00	47.50	130.00	100.00	100.00	100.00	130.00		3.17	7.80	11.50	22.60	16.60	10.60	14.50	
	S25.5	100.00	60.00	150.00	130.00	130.00	130.00	150.00		4.10	8.80	11.50	23.80	17.80	11.80	14.50	
	S25.6	130.00	85.00	180.00	150.00	150.00	150.00	180.00		7.84	10.30	17.20	24.80	18.80	12.80	21.70	
	S25.7	150.00			180.00	180.00	180.00	300.00		4.38			26.30	20.30	14.30	24.00	
	S25.8	180.00								10.04							
DN32	S32.0								100.00								6.47
	S32.1								120.00								7.84
	S32.2								150.00								8.80
	S32.3								180.00								10.04
DN40	S40.0								240.00								11.17
	S40.1								300.00								4.25

Comparison Table of Air Flow Range and Maximum Pressure Loss under Standard Conditions																	
Caliber	Flow section	Air flow (m^3/h)								Maximum pressure loss value (kPa)							
		Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection	Vertical installation, bottom-in and top-out	Vertically installed bottom-in and top-out PTFE lining	Vertically installation, top-in and bottom-out	Horizontal installation, left-in and right-out, right-in and left-out	Side installation, side-in and side-out	Bottom-side installation, bottom-in and side-out	Horizontal spring, left-in and right-out, right-in and left-out	Clamp connection and threaded connection
DN50 DN65 DN80	S50.0	130.00	95.00	180.00	130.00	130.00	130.00	180.00	150.00	2.60	4.70	22.40	20.20	11.20	8.20	24.00	4.70
	S50.1	180.00	150.00	300.00	180.00	180.00	180.00	300.00	180.00	5.50	6.00	22.40	20.70	11.70	8.40	24.00	5.50
	S50.2	300.00	240.00	500.00	300.00	300.00	300.00	500.00	300.00	4.25	6.00	22.40	22.00	16.00	10.00	24.00	4.25
	S50.3	500.00	330.00	600.00	500.00	500.00	500.00	600.00	480.00	7.50	6.50	26.00	22.00	16.00	10.00	30.00	7.50
	S50.4	600.00		750.00	600.00	600.00	600.00	750.00		10.00		40.00	22.00	16.50	10.50	42.00	
	S50.5	700.00						1000.00		13.30						44.00	
DN65	S65.0								450.00								13.30
	S65.1								900.00								7.20
	S65.2								1200.00								8.20
DN80	S80.0	300.00		500.00	500.00	500.00	500.00	500.00	900.00	4.03		14.50	22.00	16.80	10.80	16.00	7.20
	S80.1	500.00	590.00	750.00	750.00	750.00	750.00	750.00	1200.00	4.94	13.00	15.00	22.80	17.00	11.00	18.00	8.20
	S80.2	700.00		1200.00	1200.00	1200.00	1200.00	1200.00		6.87		21.00	23.00	23.00	17.00	23.00	
	S80.3	1200.00						1800.00		820						32.00	
DN100	S100.0	1200.00	590.00	1800.00	1200.00	1200.00	1200.00	1800.00	1500.00	6.50	6.50	27.00	22.50	16.50	10.50	24.00	6.50
	S100.1		950.00		1800.00	1800.00	1800.00				13.00		22.50	16.50	10.50		
	S100.2																
	S100.3	1800.00								22.00							

XVIII. Main Type Spectrum of RFC Metal Tube Rotameter



Additional Options: /XX_____ (See additional options list)

In order to ensure the accuracy level of the meter, users need to provide accurate field operating pressure, operating temperature, medium density, medium viscosity and flow range.

XIX. Minor Type Spectrum of RFC Metal Tube Rotameter

<table>
<tr><th>Item</th><th colspan="4">Manifestations</th><th>Code</th><th>Remarks</th></tr>
<tr><td rowspan="6">Companion flange</td><td>Material</td><td>Flange type</td><td>Sealing face</td><td>Series</td><td rowspan="6">Example: F0110</td><td rowspan="6">Default setting
Material: 304
Flange type: PL (Plate-type flat welding flange)
Sealing face: RF (Raised face)
Series: II (II can be changed to I)</td></tr>
<tr><td>0: 304 steel</td><td>0: PL (Plate-type flat welding)</td><td>O: RF (Raised face)</td><td>0: Series I</td></tr>
<tr><td>1: 316L steel</td><td>1: SO (Slip-on)</td><td>1: FF (Full face)</td><td>1: Series II</td></tr>
<tr><td>2: Carbon steel</td><td>2: WN (Welding neck)</td><td>2: MFM (Male-female face)</td><td></td></tr>
<tr><td>S: Special</td><td>S: Special</td><td>3: TG (Tongue and groove face)</td><td></td></tr>
<tr><td></td><td></td><td>4: RJ (Ring joint face)</td><td></td></tr>
<tr><td rowspan="4">Magnetic filter</td><td colspan="4">0: 304 magnetic filter</td><td>M0</td><td></td></tr>
<tr><td colspan="4">1: 316L magnetic filter</td><td>M1</td><td></td></tr>
<tr><td colspan="4">2: 304-PTFE magnetic filter</td><td>M2</td><td></td></tr>
<tr><td colspan="4">3: 316L-PTFE magnetic filter</td><td>M3</td><td></td></tr>
<tr><td rowspan="6">Jacket</td><td colspan="4">0: Vacuum jacketed pipe (threaded connection)</td><td>J0</td><td rowspan="2">Low-temperature standard vacuum jacketed pipe (half-pipe jacket)</td></tr>
<tr><td colspan="4">1: Vacuum jacketed pipe (flange connection)</td><td>J1</td></tr>
<tr><td colspan="4">2: Insulation jacketed pipe (threaded connection - half-pipe jacket)</td><td>J2</td><td rowspan="4">The high-temperature type must be specified to be equipped with either a half-pipe jacket or a full-pipe jacket according to customer requirements. (A full-pipe jacket means that an additional flange of the optional caliber is added to the half-pipe jacket, and the pressure and material of the flange must be consistent with those corresponding to the selected caliber.) The threaded connection structure is equipped with a threaded type, while the flange connection structure is equipped with a flange type.</td></tr>
<tr><td colspan="4">3: Insulation jacketed pipe (flange connection - half-pipe jacket)</td><td>J3</td></tr>
<tr><td colspan="4">4: Insulation jacketed pipe (threaded connection - full-pipe jacket)</td><td>J4</td></tr>
<tr><td colspan="4">5: Insulation jacketed pipe (flange connection - full-pipe jacket)</td><td>J5</td></tr>
<tr><td rowspan="2">Needle valve</td><td colspan="4">DN15 needle valve</td><td>N0</td><td rowspan="2">For this configuration, it must be determined whether a needle valve is integral or split. If an integral needle valve is required, it must also be specified whether it is for the outlet or inlet. The threaded connection type is the standard configuration of the needle valve, while the flange connection type needs to be specially customized. The price for the customized will be verified separately based on actual requirements.</td></tr>
<tr><td colspan="4">DN25 needle valve</td><td>N1</td></tr>
<tr><td rowspan="2">Constant flow valve</td><td colspan="4">DN15 constant flow valve</td><td>C0</td><td></td></tr>
<tr><td colspan="4">DN25 constant flow valve</td><td>C1</td><td></td></tr>
<tr><td rowspan="2">Explosion-proof cable gland</td><td colspan="4">0: 304 explosion-proof cable gland M20*1.5</td><td>E0</td><td></td></tr>
<tr><td colspan="4">1: 304 explosion-proof cable gland NPT1/2</td><td>E1</td><td></td></tr>
</table>

	2: 316L explosion-proof cable gland M20*1.5	E2	
	3: 316L explosion-proof cable gland NPT1/2	E3	
Compensation mode	0: Temperature compensation	T0	
	1: Pressure compensation	T1	
	2: Temperature and pressure compensation:	T2	
Export packing	0: Plywood for export packing	B0	
	1: Fumigated wooden box for export packing	B1	
	2: Carton for export packing	B2	
	3: Unmarked export packing	B3	
Certification	0: Verification certificate (in the name of customer)	A0	
	1: Verification certificate (in the name of Chuanyi)	A1	
	2: Calibration certificate (in the name of customer)	A2	
	3: Calibration certificate (in the name of Chuanyi)	A3	
	4: TS certification	A4	

Item	Manifestations	Code	Remarks
	5: PAC certification	A5	
	6: EAC certification	A6	CU-TR012 Explosion-proof CU-TR020 Electromagnetic compatibility CU-TR032 Pressure
Surface treatment	0: Copper-zinc content of wetted materials ≤0.5%	S0	
	1: Copper-zinc content of wetted materials ≤1%	S1	
	2: C3 anti-salt spray paint	S2	
	3: C3 anti-salt spray paint + varnish	S3	
	4: C5 anti-salt spray paint	S4	
	5: No oil degreasing	S5	
	6: EU EN 10204 3.1 material	S6	
Quality assurance level	0:QA1	Q1	
	1:QA2	Q2	
	2:QA3	Q3	
	3:QAN/QNC	Q4	
Handover data	0: Calibration certificates, qualification certificates and nameplates in Chinese and English, with instructions in Chinese as standard configuration	Not selected for standard configuration	The nameplate is in Chinese and English by default, and any Russian nameplate needs to be specially customized
	1: Calibration certificates, qualification certificates and nameplates in Russian, with instructions in Russian as standard configuration	H1	
	2: Calibration certificates, qualification certificates and nameplates in English, with instructions in English as standard configuration	H2	
	3. Material report	H3	Including flange, measuring tube and converter housing
	4: Pressure test report	H4	Chinese and English by default
	5: Technical passport	H5	
	6: PVC first inspection certificate	H6	
Accessories	0: Surge protector	P0	
	1: Buffer spring	P1	Buffer spring shall be provided when damper is required for liquid medium
	2: Isolated safety barrier	P2	
	3: Safety glass	P3	
	4: Chlorine filter screen	P4	Standard configuration is a must for chlorine medium
	5: Flange protective cover	P5	
	6: 316L tag No. plate	P6	Chinese and English by default

XX. Consultation Sheet of Metal Tube Rotameter

Purchaser								Contact				
Address								Tel.				
Model												
Tag No.	Medium name	Medium density	Operating pressure	Operating temperature	Operating flow range			Caliber	Quantity	Output signal	Flange standard	Material requirement
					Min.	Common	Max.					
Installation mode	Vertical installation (bottom-in and top-out) ☐ Vertical installation (upper-in and bottom-out)☐ Horizontal installation (left-in and right-out) ☐ Horizontal installation (right-in and left-out)☐ Side installation (side-in and side-out) ☐ Bottom side installation (bottom-in and side-out)☐ Horizontal spring (left-in and right-out) ☐ Horizontal spring (right-in and left-out)☐											
Accessories	Companion flange ☐ Magnetic filter ☐Surge protector ☐ Buffer spring ☐ Isolated barrier☐ Chlorine filter screen ☐ Safety glass ☐ Flange protective cover ☐ 316L Tag No. plate☐											
Remarks												

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Caution for safety:

⚠ For correct use of our products, be sure to read the Operation Manual first.