



**FLDC**

**Electromagnetic Flow Meter**

*User manual*

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# Preface

Thank you for purchasing our products!

This manual is about meter functions, settings, connection methods, operation flow, and methods to identify the faults.

Please read this manual carefully before operating and using it correctly.

After reading it, please keep it properly in the place where you may read it any time for your reference..

## Note

Modification of this manual content will not be notified as a result of some factors, such as function upgrading.

We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.

If there are some differences between subject and contents of the manual, please refer to the real subject.

Any reprint and copy of the manual content is strictly prohibited either in whole or in part.

## Measuring principle

The working principle of electromagnetic flow meter is based on Faraday's law of electromagnetic induction. The two electromagnetic coils of upper and lower ends in the right figure generate a constant or alternating magnetic field in Figure 3, when the conductive medium flows through the electromagnetic flow meter. the induced electromotive force can be detected by two electrodes on the left and right of flow meter wall ,The induced electromotive force is proportional to the conductive medium velocity, the magnetic induction intensity of the magnetic field and the conductor width (flow meter measuring tube diameter), then the medium flow can be achieved through operation. The induced electromotive force process parameters equation:

$$E = KBVD$$

Where: E—induced electromotive force;

K—instrument constant;

D—measuring tube diameter;

B—magnetic induction intensity;

V—average velocity;

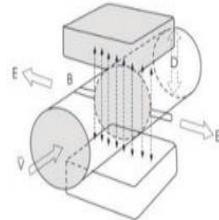


Figure 3

When measuring the flow rate, the fluid flows through the magnetic field perpendicular to the flow direction, the flow of the conductive fluid senses an electric potential which is proportional to the average flow velocity, thus requiring the conductivity of liquid which is to be measured is higher than the minimum conductivity (5 $\mu$ s/cm). The induced voltage signal is detected by two electrodes, and through the cable to the converter, after a series of analog and digital signal processing, cumulative flow and instantaneous flow will be displayed on the converter.

## Electromagnetic flow meter structure

As in figure 4, electromagnetic flow meter consists mainly of the following parts:

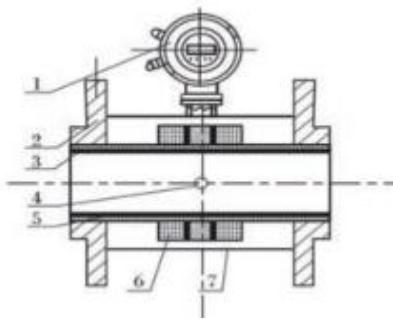


Figure 4

- 1- Converter    2- flange    3- Insulation lining    4- electrode
- 5-test tube    6- Excitation coil    7-housing

Electromagnetic flow meter consists mainly of converter and sensor, and sensor include in flange, lining, electrode, test tube, excitation coil and housing; Converter include in internal power supply and converter housing.

- (1)    Converter: providing a stable excitation current to the sensor, and amplifying the induced electromotive force by sensor, it is transformed to a standard electrical signal or frequency signal, at the same time, displays real-time

- flow and parameter, converter are used in flow of displaying, control and adjusting.
- (2) Flange: connect with process piping.
  - (3) Lining: a complete electrically insulation and corrosion resistant material between the inside of measuring tube and the flange sealing surface.
  - (4) Electrode: a pair of electrodes is mounted on a place of measuring tube wall perpendicular to the lines of magnetic force, it can measure flow signal, electrode material is selected according to the corrosion properties of the measured medium, it is equipped with 1-2 ground electrodes for ground and anti-interference of flow signal measurements.
  - (5) Test tube: the measured medium flows through the measuring tube, the measuring tube is made of non-magnetic stainless steel and flange welded, the lining is insulated lining.
  - (6) Excitation coil: the upper and lower sides of the measuring tube are fitted with a set of coils to produce a working magnetic field.
  - (7) Housing: protection of the instrument and sealing

## Installation

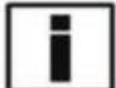
### Installation tips

#### Tips!



Please check whether the boxes are damaged or not, and whether they have been handled roughly or not. Please report the damage to the deliverer and the manufacturer.

#### Note!



Please check the packing list to make sure the goods that you have received is complete.

#### Note!



Please check the Mechanical nameplate and confirm the delivery whether is the same as your order. Checking out Power supply information whether correct on the nameplate. If not, please contact the manufacturer or the dealer.

### Storage

- The instrument should be stored in a dry and clean place.
- Please avoid exposure in direct sunlight for long.
- Instrument should be stored in the original package.

### Installation requirement

#### Note!



In order to ensure the installation reliably, the following measures must be taken.

- Enough space should be spared by its side.
- The electromagnetic flowmeter shouldn't be suffered by violent vibration.

# Pipeline design

## Pipeline design

### (1) Position

- Electromagnetic flowmeter should be installed in dry and ventilated place; it should be avoided in the water place.
- Electromagnetic flowmeter should avoid sun and rain, when you install it in an open air, it should be covered with rain and sun protection facilities. The environment temperature is between -20°C to + 60°C.
- Electromagnetic flowmeter should avoid be installed in places where the temperature changes greatly and high temperature radiation from the equipment, if must be installed, there must be insulation, ventilation measures.
- Electromagnetic flowmeter should be avoided installation in corrosive gases environment, if must be installed, there need to have ventilation and anti-corrosion measures.
- Electromagnetic flowmeter installation site as far as possible to avoid strong vibration, such as pipe vibration, electromagnetic flowmeter should be fixed the bracket of both sides.
- The sensor section of the electromagnetic flowmeter with IP68 (underwater 3 m) can be placed in water; the electromagnetic flowmeter with protection class IP65 can't be immersed in water and installed in open air.

### (2) Avoid magnetic field interference

- The electromagnetic flowmeter should not be installed near a motor or susceptible to electromagnetic interference, transformer or other power supply. Electromagnetic flowmeter do not be installed in the near inverter or from the inverter power supply cabinet to avoid the introduction of interference.

### (3) Straight pipe length

- In order to ensure the measurement accuracy of flowmeter, it is recommended that the length of the sensor upstream pipe section should be at least 5 times the diameter (5D) and the downstream straight pipe length should be at least 3 times the diameter (3D). (See Figure 8, Figure 9)

### (4) Maintenance space

- In order to the installation, maintenance, maintenance easily, electromagnetic flowmeter around needs for ample installation space.

### (5) Pipes that do not allow flow to be interrupted on the process

- In the installation of electromagnetic flowmeter should be added bypass pipe and cleaning port, as shown in Figure 10, this device can be used in the flow meter out of the case, to ensure continuous operation of the equipment system.

### (6) Electromagnetic flowmeter support

- An isolated electromagnetic flowmeter is not installed in a free-vibrating pipe, using a mounting base to fix the measuring tube. When the electromagnetic flowmeter is installed in the ground, the inlet and outlet pipes should be set the support on the both side, and in the above of flowmeter should be installed metal protective plate.

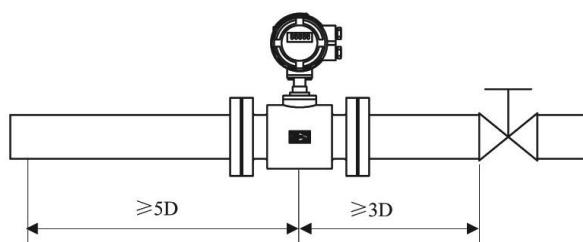
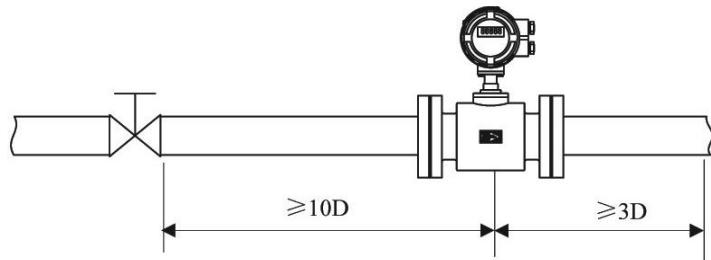
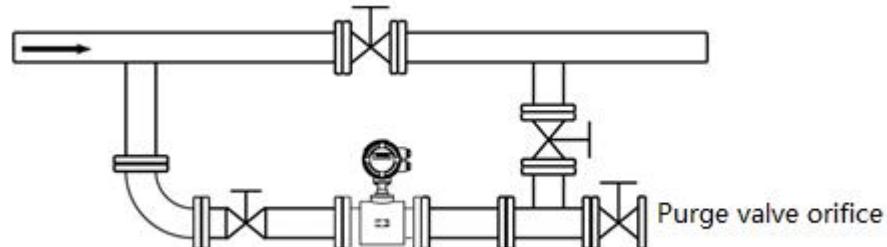


Figure 8



**Figure 9**



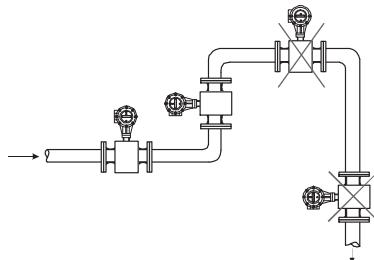
**Figure 10**

### Installation requirement

#### (1) Flow direction

The flowmeter can be set to automatically detect positive and negative flow directions, and the flow direction arrow on the sensor housing is the positive flow direction which is specified by the manufacturer. In general, when installing the instrument, users should keep the flow arrows consistent with process direction.

Figure 11 shows the installation of the electromagnetic flowmeter:



Should be installed in the lower part of the horizontal pipe and vertical upward, avoid installation at the highest point of the pipe and vertical downward

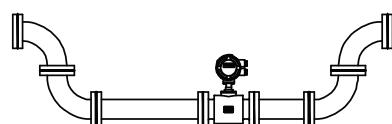
**Figure 11**

#### (2) Electromagnetic flowmeter installation direction and the installation direction of the sensor electrode

Sensor can install with level and perpendicular, sensor makes electrode installation in the horizontal position, in this way, once the media contains bubbles or precipitates, the bubbles do not adsorb in near the electrodes, causing the open converter signal, the precipitate does not cover the electrodes, causing zero drift and so on.

#### (3) Liquid should always fill with pipes

Pipe structure should ensure the electromagnetic flowmeter is always filled with liquid.



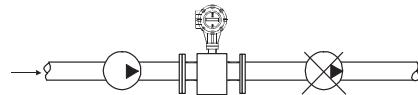
**Figure 12**

For liquids containing solid particles or slurries, it is advisable to install a vertical electromagnetic flowmeter, first, it

can prevent the measured media from separation, second, it can make the sensor lining wear more evenly, third, impurities will not produce precipitation in the bottom of measuring pipe.

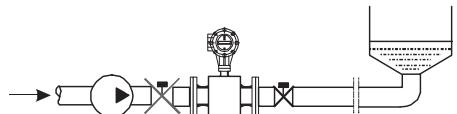
Guarantee flow flows from bottom to top to ensure that the sensor is always filled with medium.

(4) Don't install electromagnetic flow meter in the suction side of the pump.



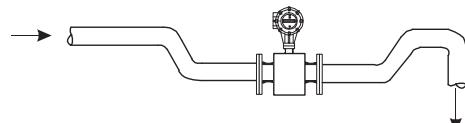
**Figure 13**

(5) For the long pipelines, control valve is installed in downstream of electromagnetic flowmeter.



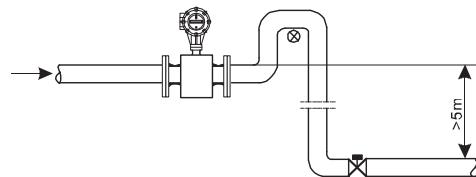
**Figure 14**

(6) Open discharge pipeline, electromagnetic flowmeter should be installed in the bottom of pipe (lower pipe).



**Figure 15**

(7) For the place where the pipe drop more than 5 meters, an air valve should be installed downstream of the electromagnetic flowmeter.



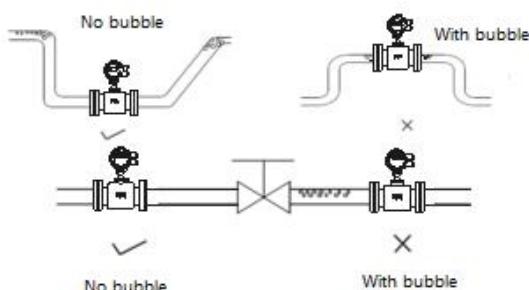
**Figure 16**

(8) Avoid measurement errors caused by incidental gas and damage to the lining caused by vacuum.

(9) There should be no bubbles in the pipe

The piping design should ensure that no gas is separated from the liquid.

Flowmeter should be installed upstream of valve, because of action of the valve, the pressure in the pipe is reduced resulting in air bubbles. Besides, you should install the meter in the low section to reduce the effect of entrained air bubbles on the measurement.



**Figure 17**

## (10) Liquid conductivity

Do not install electromagnetic flowmeter where the conductivity of the liquid is extremely uneven. In the upper of the instrument inject chemical substances which easily lead to uneven liquid conductivity, so it will result in serious interference to the instrument flow instructions. In this case, it advises to inject chemical substances in the downstream of the instrument. If chemical substances must be injected from the upper reaches of the instrument, it is necessary to ensure that the upstream straight pipe is at least 30 times diameter to mix liquid adequately.

## (11) Ground

Because the electromagnetic flowmeter sensor signal voltage is very small, it is affected easily by external noise or other electromagnetic signals, so the electromagnetic flowmeter need to be grounded in many occasions, its role is through the flowmeter shell housing grounding to form an internal space that can shield the interference of outside.

## Mechanical installation

### Installation of flowmeter pipe

(1) Before installing the flowmeter, the piping should be checked to ensure that the path of the meter has a good concentricity with the user's pipe. The nominal diameter of sensor is lower 50mm, the axis is high not more than 1.5mm, 65 ~ 300mm nominal diameter shall not exceed 2mm, 350mm and above the nominal diameter shall not exceed 4mm.

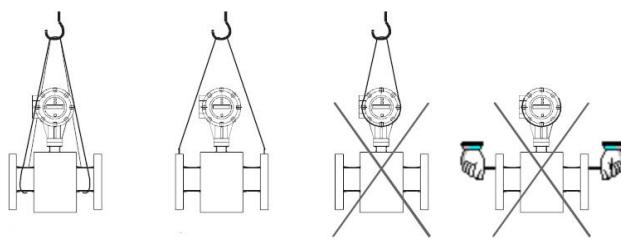
(2) The newly installation pipes are generally have objects (such as welding slag). The objects should be washed off before flow meter is installed; this not only prevents the lining from being damaged but also prevents foreign matter causing measurement error by the measuring tube during the measurement.

### Precautions

#### Operating known:

(1) Be careful when unpacking, don't break the instrument.

It is best not to unpack it before it is transported to the installing place to avoid damaging the instrument. Use the mounting ring when lifting the instrument. Do not lift the instrument with a bar or rope through the sensor measuring tube. Please refer to the figure below for correct lifting.



**Figure 18**

(2) Prevent the instrument from being vibrated

To prevent heavy throw, heavy pressure to instruments, especially the surface of the flange don't be force (it may damage the lining result in the instrument can't work).

(3) Flange surface protection

Please pay attention to the protection of the flange after instrument unpacking; it is prohibited to place the flange on a ground that is not padded or other uneven plate.

(4) Line box

Don't open the terminal box cover before making electrical wiring. After the wiring is completed, please as soon as

possible to put our company's special junction box sealant into the junction box, and cover the wiring box cover; tighten the screws to ensure its sealing,

If the electromagnetic flowmeter the protection level is IP68, instrument factory has done a good waterproof seal.

#### (5) Haven't use for a long time

After the instrument is installed, you should avoid long-term not use. If there is a long time not to use, you must take the following measures on the instrument:

A. Check the end cover, the port seal to ensure that moisture and water will not enter instrument.

B. Regular inspection. Check the above mentioned measures and the situation within the junction box, check at least once a year. In the event of possible water immersion in the instrument (e.g.: after rain), check the meter immediately.

## Flowmeter installation

### (1) Install direction

The flow direction of the measured fluid shall be consistent with flowmeter flow direction.

(2) The flange washer should has a good corrosion resistance function, the gasket shall not be inserted into the pipeline

(3) Welding or flame cutting in the sensor adjacent to the pipeline should take isolation measures to prevent the lining heat deformation..

(4) If it is installed in the dark well or immersed in water work, after system installation and commissioning, it need to seal the sensor with a sealant junction box. (If the electromagnetic flowmeter selection is protection level IP68, the instrument factory has done a good waterproof seal.)

(5)In the field installation, the bolts are used to connect the flange on the sensor to the flange on the pipe. The bolts and nuts of the instrument are tightened, and the thread should be intact and lubricated. At the same time, the flat and spring washers are used. The torque wrench should be used to fasten bolts according to the flange size and torque. In the daily use, you should regular fasten bolts to prevent the bolt loosing.

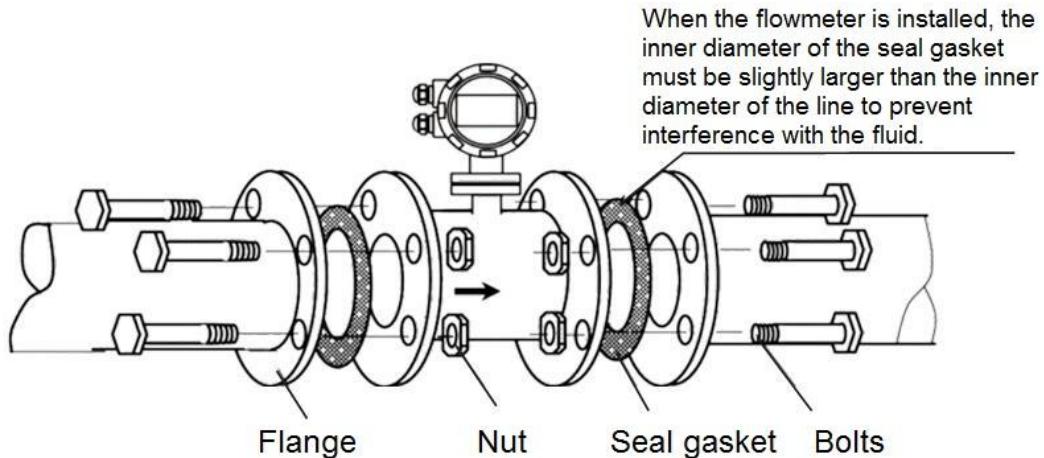


Figure 19

# Dimension

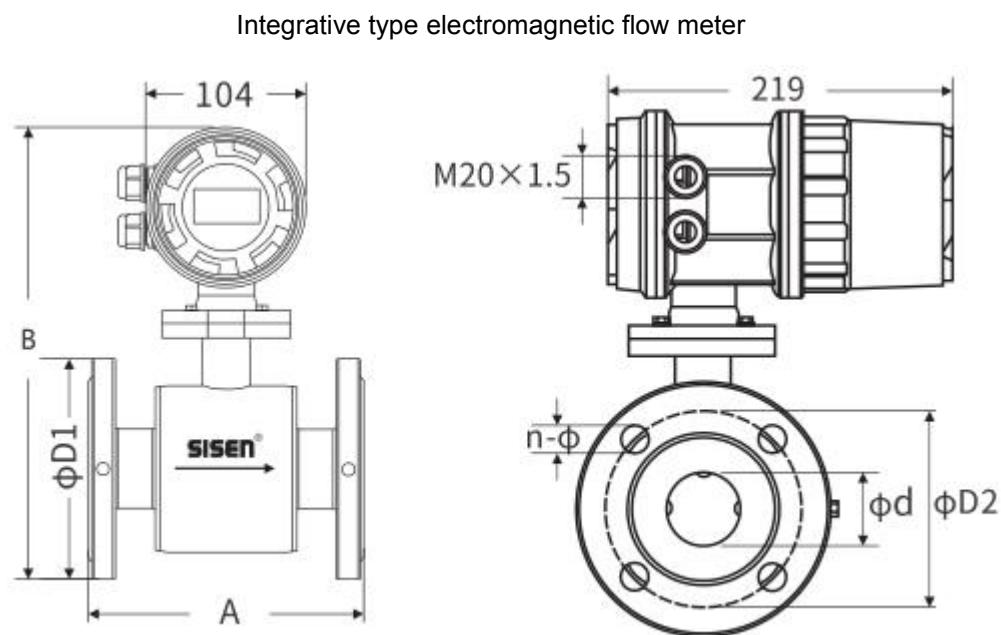
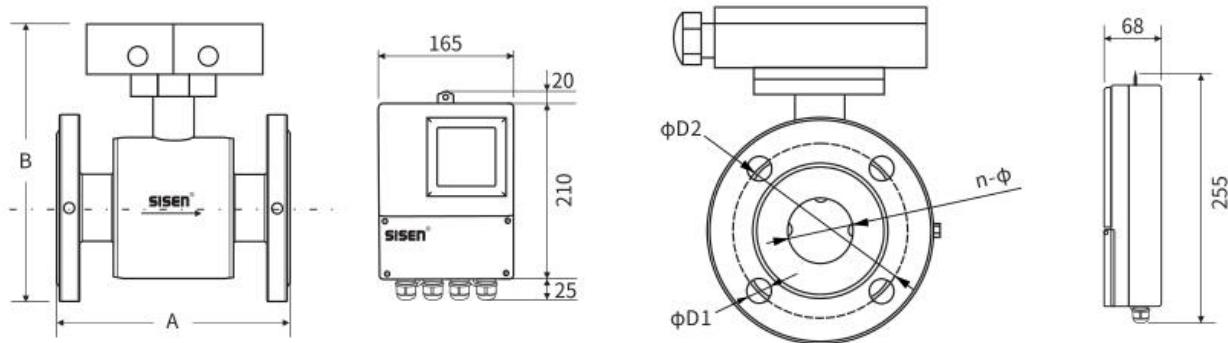


Figure 20

Diameter (mm)	Rated pressure (MPa)	Dimension (mm)						Weight (kg)
		A	B	$\phi D_1$	$\phi D_2$	$\phi d$	$n-\phi$	
10	4.0	200	290	90	60	10	4- $\phi 14$	5.5
15		200	315	95	65	15	4- $\phi 14$	6
20		200	315	105	75	20	4- $\phi 14$	6.5
25		200	315	115	85	25	4- $\phi 14$	6
32		200	315	140	100	32	4- $\phi 18$	9
40		200	315	150	110	40	4- $\phi 18$	10.5
50		200	320	165	125	50	4- $\phi 18$	11.5
65	1.6	200	350	185	145	65	4- $\phi 18$	15
80		200	365	200	260	80	8- $\phi 18$	15
100		250	380	220	180	100	8- $\phi 18$	20
125		250	410	250	210	125	8- $\phi 18$	24
150		300	440	285	245	150	4- $\phi 22$	34
200	1.0	350	495	340	295	200	4- $\phi 22$	41
250		450	545	395	350	250	12- $\phi 23$	64
300		500	597	445	400	300	12- $\phi 23$	74
350		600	652	505	460	350	16- $\phi 23$	92
400		600	700	565	515	400	16- $\phi 26$	108
450		600	767	615	565	450	20- $\phi 26$	128
500		600	815	670	620	500	20- $\phi 26$	151
600		600	933	780	725	600	20- $\phi 30$	198
700		700	1034	890	840	700	24- $\phi 30$	256

800		800	1144	1015	950	800	24-φ33	340
900		900	1215	1115	1015	900	28-φ33	453
1000		1000	1357	1230	1160	1000	28-φ35	526
1200	0.6	1200	1510	1405	1340	1200	32-φ33	684
1400		1400	1710	1630	1560	1400	36-φ36	853
1600		1600	1895	1830	1760	1600	40-φ36	1036
1800		1800	2095	2045	1970	1800	40-φ39	1316
2000		2000	2328	2265	2180	2000	48-φ42	1746

Split type electromagnetic flow meter



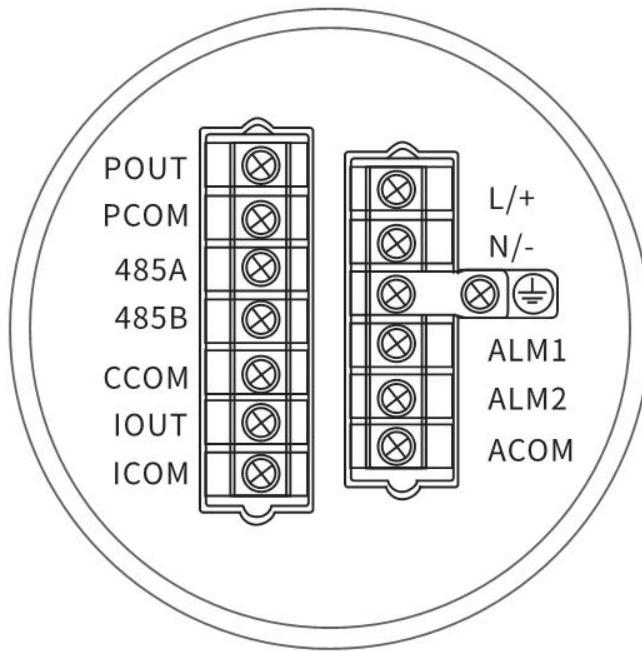
Diameter (mm)	Rated pressure (MPa)	Dimension (mm)						Weight (kg)
		A	B	φD1	φD2	φd	n-φ	
10	4.0	200	290	90	60	10	4-φ14	5.5
15		200	315	95	65	15	4-φ14	6
20		200	315	105	75	20	4-φ14	6.5
25		200	315	115	85	25	4-φ14	6
32		200	315	140	100	32	4-φ18	9
40		200	315	150	110	40	4-φ18	10.5
50		200	320	165	125	50	4-φ18	11.5
65	1.6	200	350	185	145	65	4-φ18	15
80		200	365	200	260	80	8-φ18	15
100		250	380	220	180	100	8-φ18	20
125		250	410	250	210	125	8-φ18	24
150		300	440	285	245	150	4-φ22	34
200	1.0	350	495	340	295	200	4-φ22	41
250		450	545	395	350	250	12-φ23	64
300		500	597	445	400	300	12-φ23	74
350		600	652	505	460	350	16-φ23	92
400		600	700	565	515	400	16-φ26	108
450		600	767	615	565	450	20-φ26	128
500		600	815	670	620	500	20-φ26	151
600		600	933	780	725	600	20-φ30	198

700		700	1034	890	840	700	24-φ30	256
800		800	1144	1015	950	800	24-φ33	340
900		900	1215	1115	1015	900	28-φ33	453
1000		1000	1357	1230	1160	1000	28-φ35	526
1200		1200	1510	1405	1340	1200	32-φ33	684
1400		1400	1710	1630	1560	1400	36-φ36	853
1600	0.6	1600	1895	1830	1760	1600	40-φ36	1036
1800		1800	2095	2045	1970	1800	40-φ39	1316
2000		2000	2328	2265	2180	2000	48-φ42	1746

Note: there might be some small differences between the size and weight in the above picture and the real product, so please remember all the parameters of the real product are the final value.

## Electrical Connection

### Integrated type



The converter power supply is 220VAC power supply

Including allowed band: 100VAC -240VAC, 50Hz-60Hz

- L: AC phase line;
- N: AC zero line;
- Connect the ground wire to grounding screw of notation symbol  $\equiv$



The converter power supply is 24VDC power supply

Including allowed band: 22VDC-26VDC

- +:24VDC positive and negative;

- -: 24VDC negative

### Current output:

- IOUT :4-20mA output positive
- ICOM :4-20mA output negative
- Active mode: when load  $R_L \leq 750\Omega$ ;  $I_{max} \leq 22mA$
- Current corresponds to the flow percentage

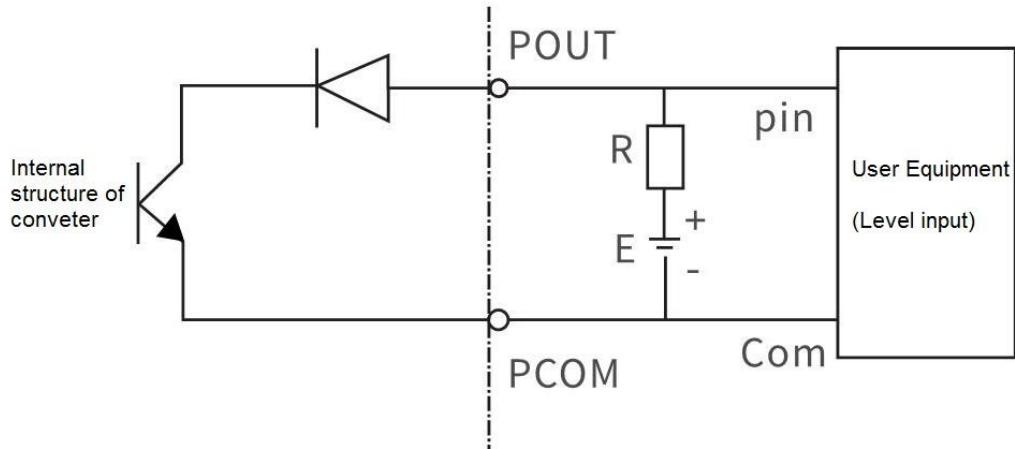
### Communication output

- 485A,485B: 485 serial communication output
- CCOM: RS485 serial communicaton
- Agreement : ModBus RTU

### Pulse, frequency and alarm output:

- POUT、PCOM: Pulse/frequency output
- Active mode: high level 24V, drive current 5mA
- Output electrical isolation: photoelectric isolation, isolation voltage> 1000VDC;
- Scale:  
Frequency output: frequency 2 kHz (configurable 0-5kHz) corresponding to the upper limit of the flow range;  
Pulse output: corresponding flow rate volume of each pulse (configurable) , output pulse width: 0.1ms ~ 100ms, duty cycle 1: 1,  $F_{max} \leq 5000$  cp / s;

### Wiring schematic diagram:

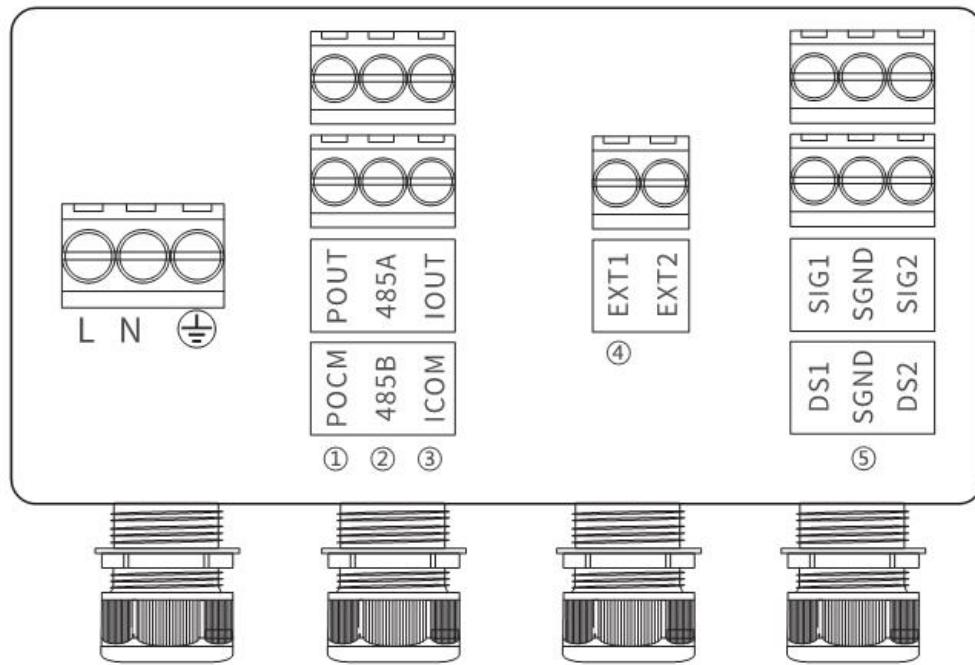


Supplementary note: The pulse output is an OC gate output, which requires external power supply.

General counters are equipped with pull-up resistors, and the signal can be directly connected to the count.

Manufacturer's suggestion: The pull-up resistor R in the picture is recommended to use 2K, 0.5W resistors, and the power supply E is recommended to use 24V DC.

## Split type



The converter power supply is 220VAC power supply

Including allowed band: 100VAC -240VAC, 50Hz-60Hz

- L: AC phase line;
- N: AC zero line;
- Connect the ground wire to grounding screw of notation symbol  $\ominus$



The converter power supply is 24VDC power supply

Including allowed band: 22VDC-26VDC

- +:24VDC positive and negative;
- -: 24VDC negative

### Current output:

- IOUT :4-20mA output positive
- ICOM :4-20mA output negative
- Active mode: when load  $RL \leq 750\Omega$ ;  $I_{max} \leq 22mA$
- Current corresponds to the flow percentage

### Communication output

- 485A,485B: 485 serial communication output
- CCOM: RS485 serial communicaton
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### Pulse, frequency and alarm output:

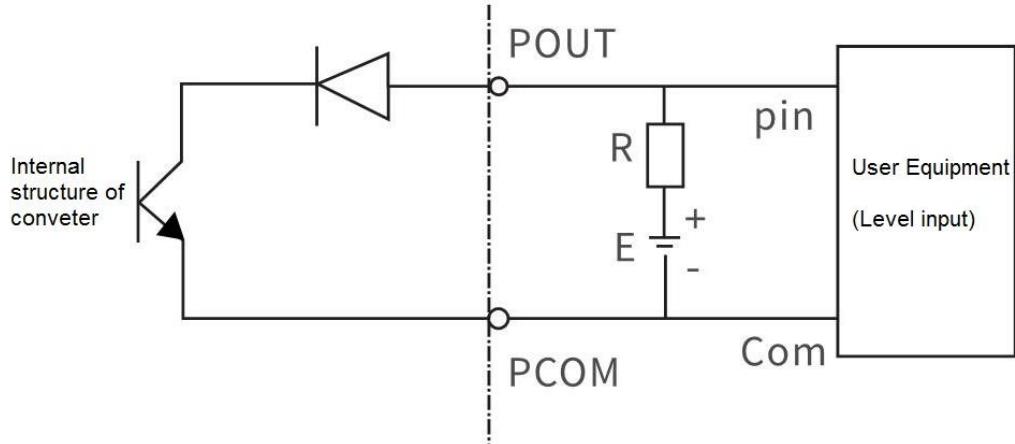
- POUT、PCOM: Pulse/frequency output
- Active mode: high level 24V, drive current 5mA
- Output electrical isolation: photoelectric isolation, isolation voltage> 1000VDC;

- Scale:

Frequency output: frequency 2 kHz (configurable 0-5kHz) corresponding to the upper limit of the flow range;

Pulse output: corresponding flow rate volume of each pulse (configurable), output pulse width: 0.1ms ~ 100ms, duty cycle 1: 1, Fmax <= 5000 cp / s;

**Wiring schematic diagram:**

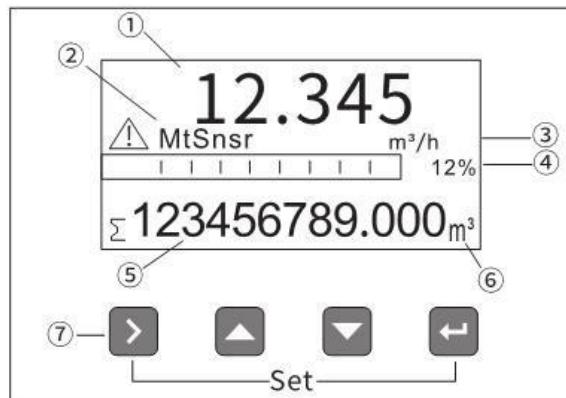


Supplementary note: The pulse output is an OC gate output, which requires external power supply.

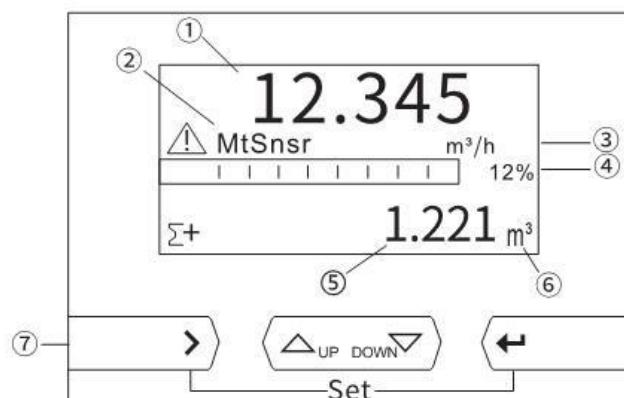
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Manufacturer's suggestion: The pull-up resistor R in the picture is recommended to use 2K, 0.5W resistors, and the power supply E is recommended to use 24V DC.

# Display



Operation interface of split type



Operation interface of integrated type

- ① Instantaneous flow rate
- ② System alarm information
- ③ Instantaneous flow unit
- ④ Instantaneous flow in percent of flow
- ⑤ Cumulative amount

Display information [ $\Sigma +$ : Positive flow accumulation,  $\Sigma -$ : Negative flow accumulation,  $\Sigma$ : Net flow accumulation, V: current flow rate, MT: current conductivity]

- ③ Accumulation flow unit
- ⑦ Split type: capacitive touch button      Integrated type: Mechanical micro switch

symbol	Measuring mode	Menu mode	Function mode	Data mode
>	-	Switch menu categories	-	Data right shift
↓	Switch cumulative amount	Switch menu subclass	Confirm function	Confirm data
↑↓	-	-	Selection function	Change data
>+↓	Enter menu	Exit menu	-	-

# Operating instruction

## Quickly set important parameters of the instrument

Press [>] and [ $\downarrow$ ] together, enter into parameter setting interface.

Password need to be input by then:

Password for quick setup: 300000 (for quickly modifying the important parameters)

No.	Parameter	Setting method	Parameter range	Default
1	Sensor diameter	Option	3-2000	50
2	Flow range	digit	0-99999	35.000
3	Sensor coefficient	digit	0-99999	1.000
4	Zero point correction	digit	0-99999	0.0
5	Flow cut off	Option	Y.N	N
6	Cumulative reset	digit	0.99%	1%
7	Time constant	digit	0-99S	2S

## Parameter selection and adjustment

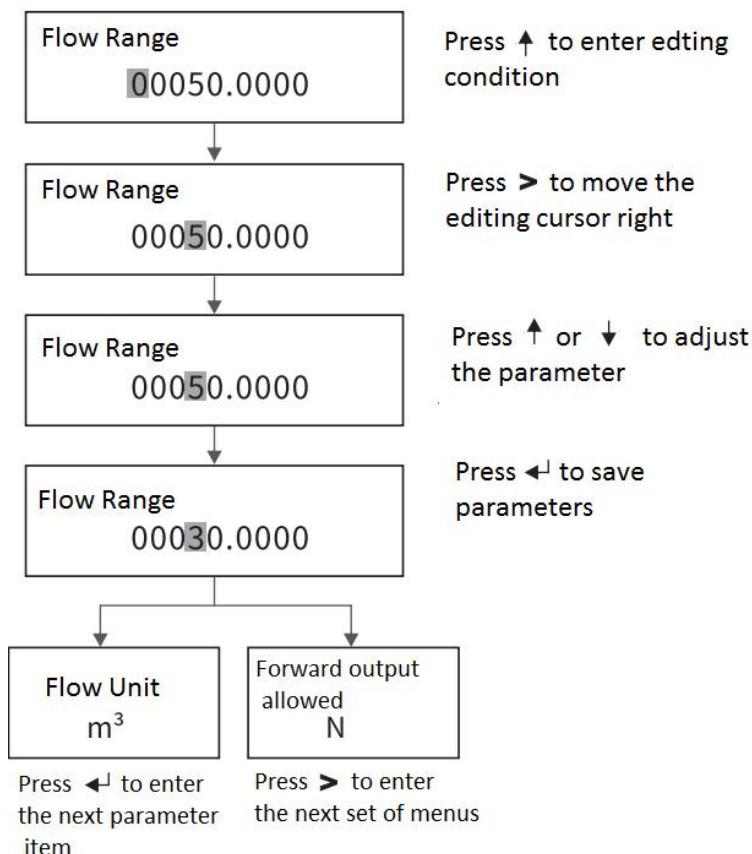
Press [>] and [ $\downarrow$ ] together, enter into parameter setting interface.

Password need to be input by then:

### The initial users password: 200000 (used for modifying the user level parameter)

After entering the configuration parameters, the parameters can be modified by the following operation:

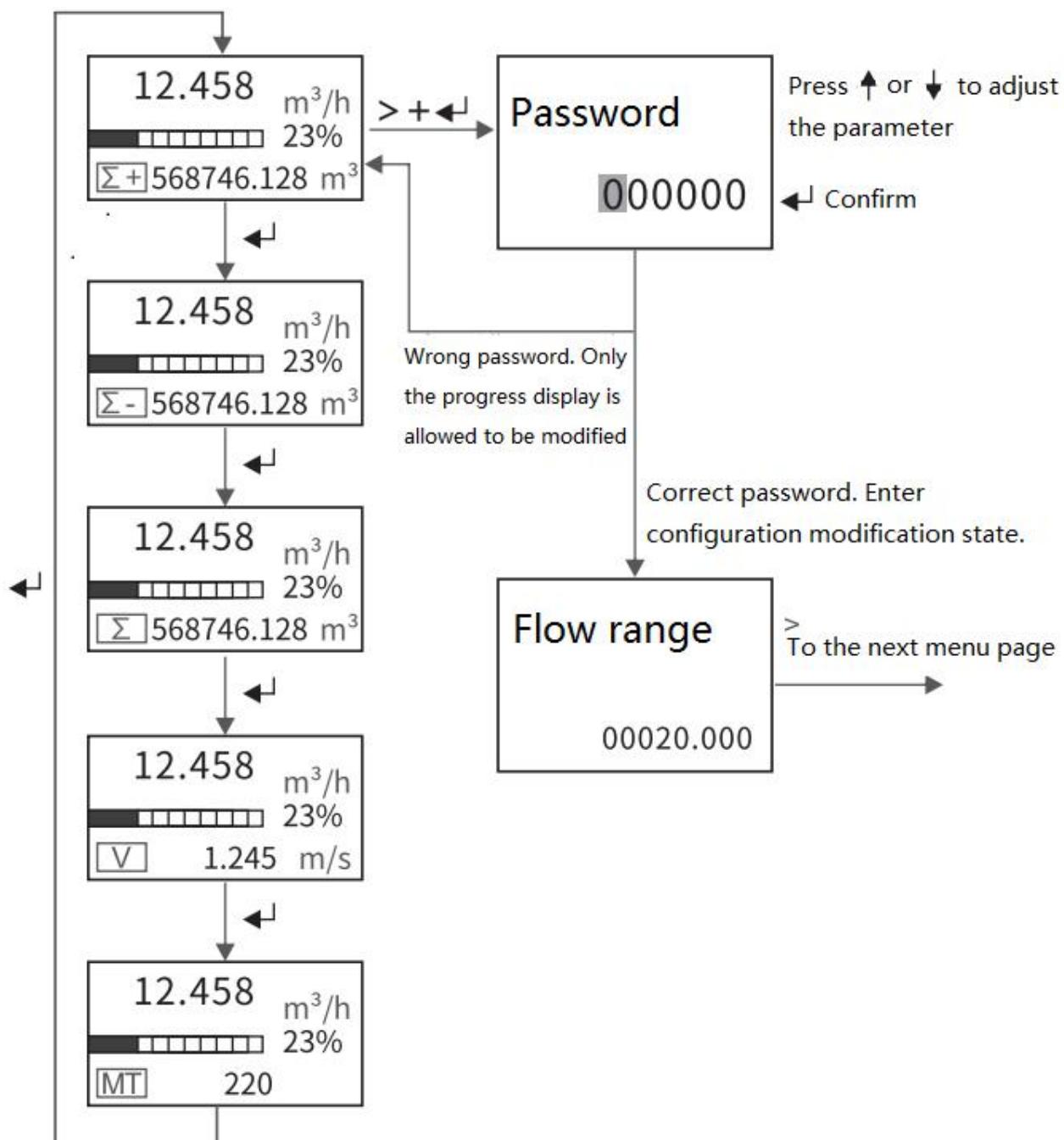
User can conduct the switch operation in the menu by pressing the **[>]** button, switch among the parameter item of menu by pressing the **[ $\downarrow$ ]** button, and store a modified parameter value at the same time, **[ $\uparrow$ ]** enter editing state, adjust the parameter value by pressing the **[ $\uparrow$ ]** and **[ $\downarrow$ ]** buttons. Such as adjusting the "flow upper limit".



## Measuring Interface

" $\Sigma +$ ": forward cumulation, " $\Sigma -$ ": reverse cumulation, " $\Sigma$ ": net cumulation,

"V": current flow velocity, "MT": conductivity equivalent



## Configuration details

NO	Parameter	Setting mode	Password level	Parameter range	Default
<b>1- Flow rate</b>					
1-0	Flow range	Figure	User	0-99999	50.000
	Set the maximum flow limit value. Used to calculate the frequency, output current limit calculation; Alarm threshold calculation, etc.				
1-1	Flow unit	Option	User	L, m <sup>3</sup> , Kg, t /s, min, h	m <sup>3</sup> /h
	Set the flow units, choose Kg, t ,such as mass unit, need to cooperate with 1-2 density parameter.				
1-2	Fluid density	Figure	User	0.000-99.000	1.000
	Used to calculate the mass flow rate, QM = $\rho$ V M when flow volume unit is volume unit t, this parameter will not be displayed. Density of the unit: g/cm <sup>3</sup>				
1-3	Time constant	Figure	User	0-99S	2s
	Damping coefficient of the filter, select the parameters of the selected period of time as the average of the instantaneous flow				
1-4	Flow resection	Figure	User	0-10%	1%
	Flow volume is regarded as zero if it is below the setting value Zero means not remove				
1-5	Flow direction	Option	User	Positive Negative	Positive
	Used to change the direction of flow, when the user signal lines negative pole and positive pole are reverse connection, or reverse sensor installation, use this feature				
1-6	Mode selection	Option	User	Positive , negative , bidirection	bidirection
	Set the direction of the flow measurement, forward direction indicates only for forward direction measurement flow, reverse indicate only measure the reverse flow, two-way indicate two-way flow measurement				
<b>2-Output</b>					
NO	Type	Option	Password level	Parameter range	Defaults
2-0	Reverse output permission	Option	User	Y, N	N
	when the flow is set in opposite direction , whether it output 4-20mA, pulse / frequency				
2-1	Adjust K	Figure	User	0-99999	1.000
	Used for adjusting the output current value, I = Kx + B				
2-2	Adjust B	Figure	User	0-99999	0.000

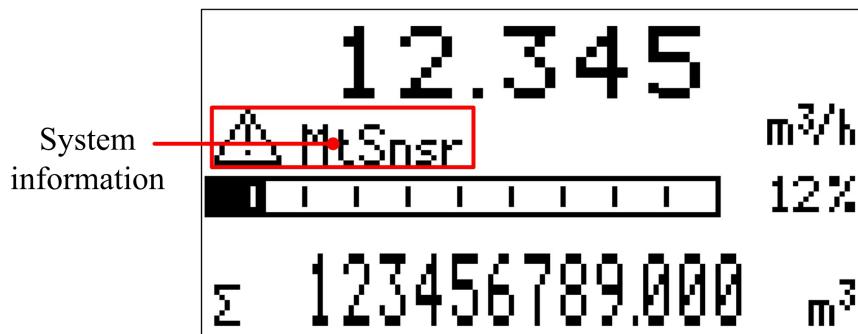
	Used for adjusting the output current value, $I = Kx + B$				
2-3	Output current	Display	User	4.00-20.00	--
	Display the current output of current value, unit :mA				
<b>3-Pulse/frequency/alarm output</b>					
3-0	Pulse output type	Option	User	Frequency, Pulse, alarm (integrated)	Frequenc y
	Optional pulse equivalent / frequency / alarm output, The alarm contact output is only included in integrated type flowmeter.				
3-1	No output transistor state	Option	User	High / low level	High level
	Frequency output, no pulse equivalent output, no alarm output level of the output level state				
3-2	Max. frequency	Figure	User	0-5000	2000
	Set the corresponding value of the instantaneous flow upper limit ; when select for frequency output , this parameter display				
3-3	Pulse unit equivalent	Option	User	0.001L-1m <sup>3</sup>	1.0L
	Set the cumulate that each pulse stands for; When selecting is the equivalent output, this parameter display.				
<b>8-System</b>					
8-0	Language	Option	User	Chinese/English	100%
	Decimal place of Instantaneous				
8-1	Display accuracy	Figure	User	0-4	2
	Decimal place of Instantaneous				
8-2	Contrast	Figure	User	0-100%	50%
	Liquid crystal display contrast				
8-3	Communicate address	Figure	User	1-247	8
	Instrument address of Modbus RTU communication protocol based on RS-485 protocol				
8-4	Communication baud rate	Option	User	1200, 2400, 4800, 9600, 19200	9600
	The baud rate of physical layer serial communication				
8-5	Check way	Option	User	2-1 4-3、3-4 1-2、4-3 1-2、 1-2 3-4	2-1 4-3
	The check way of physical layer serial communication				
8-6	User password	Figure	User		000000
	User-level password for viewing and modifying user-level parameter configuration When it enters with manufacturer's password, the parameter is not displayed				
	The factory initial value is: 200000				

# Functions

## System information

Flow meter itself has the self-diagnosis function, in addition to the power supply and circuit board hardware failures; it can correctly provide the corresponding alarm message to the fault in general application.

### Display position in measuring picture



### System information sheet

Display	Alarm content
MtSnsr	Sensor empty pipe
Hi	The current instantaneous flow rate exceeds the setting flow limit
Lo	The current instantaneous flow rate is below the setting flow lower limit
Pls	The pulse output frequency exceeds the setting frequency upper limit
Coil	Abnormal situation of sensor excitation drive
AD_Hi	Sensor signal is greater than the AD sampling of the upper limit
AD_Exc	The sensor common-mode voltage can't adjust the acceptable range of the system
Rng	The current instantaneous flow rate exceeds the setting flow limit
Rng_Hi	The current instantaneous flow rate exceeds system AD sampling limit
Pls_Hi	The range scope set by user exceeds the upper limit of pulse output.

## Pulse/Frequency/Current output

### Pulse equivalent output

It is mainly used for sensor manufacturer coefficient calibration and user measurement use. In the third way configuration parameter 3-3 Settings:

Pulse equivalent corresponding with accumulation, indicating each pulse corresponding to the relevant volume number.

For example: parameter setting as 0.1L/p

The current instantaneous flow is 3.6m³ / h

Number of pulses per second output is:  $3.6 \times 1000/3600 / 0.1 = 10$

Note:

If you encounter the situation that the current quantity cannot be divided, the deficiency will automatically accumulate the next second output. The number of pulses in per second pulse maximum output is 5000, if the instantaneous volume is relatively large and set the equivalent is likely to exceed 5000, then the main screen will appear Pls system alarm information. It requires the user to reset the pulse equivalent parameter.

### **Frequency output**

It is mainly used for manufacturer coefficient calibration and user measurement use. In the third group configuration parameters setting: frequency corresponding to instantaneous flow rate , upper frequency limit corresponding to max flow rate.

Note: the maximum frequency set to 5000 Hz.

### **Current output**

Mainly used for transmitting output to other intelligent instruments, such as: digital display table, recorder etc.

The current output type is: 4-20mA.

The current value corresponds to instantaneous flow rate; 20mA corresponding to range limit.

Conversion relationship:

$$Q_r = (I_r - 4.00) / 16.00 \times Q_m$$

Description:  $Q_r$  : instantaneous flow

$Q_m$  : Current instrument flow range

$I_r$  : Real-time current value

## **Serial communication**

The instrument provides a standard RS-485 serial communication interface, using the international standard MODBUS-RTU communication protocol that supports 04 read holding registers command.

### **Register address**

Communication data and register address in the following table:

parameter	type	address	order	description
Instantaneous flow	float	100	0x04	
Instantaneous flow velocity	float	102	0x04	
Flow percentage	float	104	0x04	50 means 50%
Conductivity	float	106	0x04	
Forward traffic accumulates integer	ulong	108	0x04	
Forward flow cumulative decimal	ulong	110	0x04	The decimal part has been enlarged by 1000 times, 123 means 0.123
Reverse traffic accumulative integers	ulong	112	0x04	
Reverse traffic accumulative decimal	ulong	114	0x04	The decimal part has been enlarged by 1000 times, 123 means 0.123
Unit of flow	ushort	116	0x04	0x00:L 0x01:m3 0x02:kg 0x03:t
Unit of time	ushort	117	0x04	0x00:s 0x01:min 0x02:h
Unit of flow cumulation	ushort	118	0x04	The same as that of flow

Alarming state	ushort	119	0x04		
System alarm	bit	119.0	0x04	0: no alarm	1: with alarm
Empty pipe alarm	bit	119.1	0x04	0: no alarm	1: with alarm
Upper limit alarm	bit	119.2	0x04	0: no alarm	1: with alarm
Lower limit alarm	bit	119.3	0x04	0: no alarm	1: with alarm

### Communication configuration

Communication address: 1-247

Default address: 8

Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600;

The default baud rate: 9600.

Check: no check, odd parity, parity;

Default No check.

For 32-bit data (long integer or floating-point) arranged in the communication frame.

Example: long integer 16909060 (01020304H): 03 04 01 02

Floating point 4.00 (40800000H): 00 00 40 80

### Readout real-time quantity floating- point communications

Example:

Send message: 08 04 00 0A 00 02 51 50

Return message: 08 04 04 22 6E 41 3F 79 61 (real-time quantity: 11.95)