MULTI-FUNCTION TURBINE

F L O W M E T E R

# Multi-function Turbine Flowmeter

User Manual

(Version 21)


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# I. General

## 1.1 Introduction

LWGY turbine flow meter consists of turbine flow sensor and display instrument and it is made by us using foreign state-of-the-art technologies, which is an ideal gauge for measuring of liquid flow.
The flow meter is characterized by simple structure, high precision and easy installation and repair. the product can be used in a wide range of industries, including oil industry, chemical industry, metallurgy, water supply, paper-making, environment protection and food industry.
It is applicable in closed pipes to measure flow of liquid which will not erode stainless steel (1Cr18Ni9Ti), 2Cr13, $Al_2O_3$ and hard alloy and is free of impurities such as fiber and granules. if this product is used in association with display instruments with special functions, it can be used for purpose of automatic definite quantity control and alarming in case of excessive amount.

## 1.2 Product Features

① Hard alloy bearing thrust type sensor, guarantee precision, improve wear resistance performance.

② Simple and firm structure, easy for installation and dismantling.

③ Wide measuring range, low flow velocity workable.

④ Small pressure loss, fine repeat ability, high precision.

⑤ High resistance to electromagnetic interference

## 1.3 Working Principle

When liquid flows through the sensor, the impulse of fluid will provide the blade with a rotation moment as there is an angle between the blade of impeller and the flow direction. the blade will rotate as the friction moment and the fluid resistance are overcome and it will reach a stable speed when the moments are at balance. under certain conditions, the rotation speed of



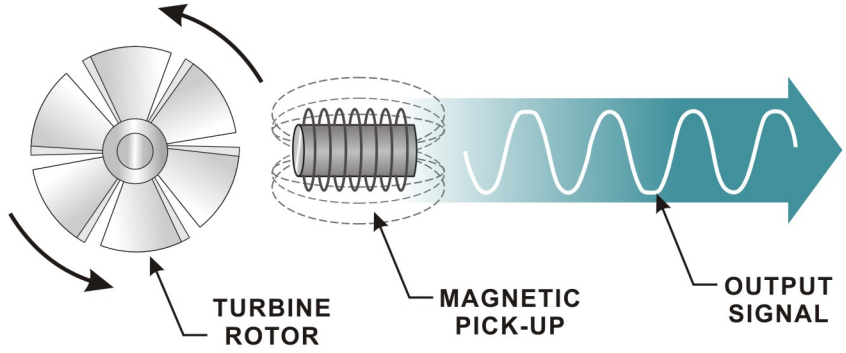


blade will be in direct proportion to the flow velocity. due to the magnetic conductivity of blade, when located in the magnetic field generated by signal detector (made of permanent magnet steel and coils), the rotating blade will cut the magnetic lines and periodically change the flux through the coil, thereby inducing electrical impulse signals at both ends of the coil. the induced signals, after amplified and rectified by amplifier, will form a continuous rectangular impulse wave with certain amplitude which may be remotely transmitted to display instrument indicating the instant flow and the cumulative flow of fluid. within a certain range of flow, the impulse frequency is in direct proportion to the instant flow of fluid flowing through the sensor, which is shown in the equation below:

Wherein:

| | |
|---|---|
| f | Impulse frequency [Hz]; |
| k | Instrument factor of sensor [$1/m^3$], which is given by checklist. [1/L] is used as the unit, the equation will be; |
| Q | Instant flow of liquid (in operation) [$m^3/h$]; |
| 3600 | Conversion factor. |

Instrument factor of each sensor will be filled out in verification certificate by the manufacturer. the instant flow and cumulative flow will be displayed when the value of k is loaded into associated display instrument.



**Size- Flow Range- Connection**

| Size | Standard Flow Range($m^3$/h) | Extended Flow Range($m^3$/h) | Common Connection & Pressure | Customized Pressure |
|---|---|---|---|---|
| DN4 | 0.04-0.25 | 0.04-0.4 | Thread/6.3MPa | 4-42MPa |
| DN6 | 0.1-0.6 | 0.06-0.6 | Thread/6.3MPa | |
| DN10 | 0.2-1.2 | 0.15-1.5 | Thread/6.3MPa | |
| DN15 | 0.6-6 | 0.4-8 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN20 | 0.8-8 | 0.45-9 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN25 | 1-10 | 0.5-10 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN32 | 1.5-15 | 0.75-15 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN40 | 2-20 | 1-20 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN50 | 4-40 | 2-40 | Thread/6.3MPa | |
| | | | Flange/4.0MPa | |
| DN65 | 7-70 | 3.5-70 | Thread/1.6MPa | |
| | | | Flange/1.6MPa | |
| DN80 | 10-100 | 5-100 | Thread/1.6MPa | |
| | | | Flange/1.6MPa | |
| DN100 | 20-200 | 10-200 | Thread/1.6MPa | |
| | | | Flange/1.6MPa | |
| DN125 | 25-250 | 12.5-250 | Flange/1.6MPa | |
| DN150 | 30-300 | 15-300 | Flange/1.6MPa | |
| DN200 | 80-800 | 40-800 | Flange/1.6MPa | |
| Remark: Tri-clamp connection optional (Size DN4-DN80, pressure 1.6MPa) | | | | |



Multi-function Turbine Flowmeter

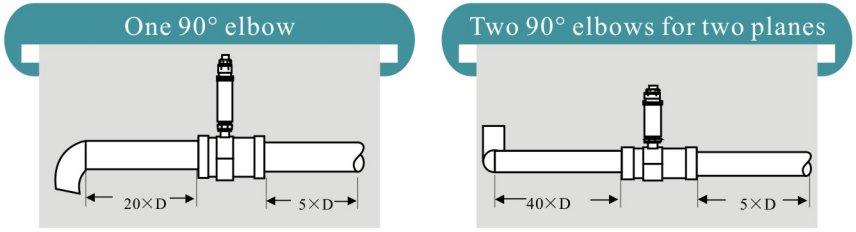
## II. Installation Requirements

Flow meter may be installed horizontally or vertically. in the latter case the fluid shall be flowing from downward and fulfill the pipe to avoid bubbles; the flowing direction of liquid shall be consistent with the direction indicated by the arrow on casing of the sensor; as far as front and rear straight pipe sections are concerned , at upstream there shall be front straight pipe section at least 10 times of nominal drift diameter in length and at downstream no less than 5 times of nominal drift diameter in length. the internal wall of pipe sections shall be smooth and clean, free of defects such as indent, fouling and peeling. the pipe axis of the sensor shall be aligned with that of the neighboring pipe and the washers used for connection and sealing may not be embedded into depth of the pipe cavity; the sensors shall be kept away from foreign electric field and magnetic field, effective shielding measures shall be taken in case of necessity to avoid external interference.

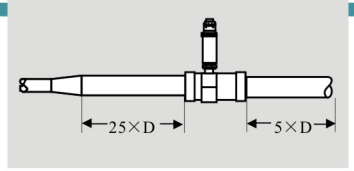
In order that the normal transfer of liquid will not be affected by maintenance, it is recommended that bypass pipes be installed at position of sensor.

In case of open air installation, water proof measures shall be taken for purpose of amplifier and plug of the sensor. the wiring between sensor and display instrument is shown in Fig. as below.

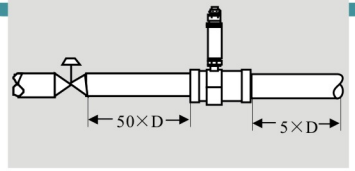
When fluid contains impurities, filter shall be additionally installed. the number of filter screen meshes is determined in accordance with the flow and impurity, normally 20 to 60 meshes. when fluid is mixed with free gases, gas eliminator shall be additionally installed. the complete pipe system shall be well sealed. the user shall fully understand the erosion nature of the measured medium to protect the sensor from being eroded.



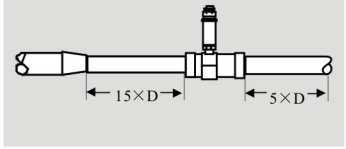
Concentric expander



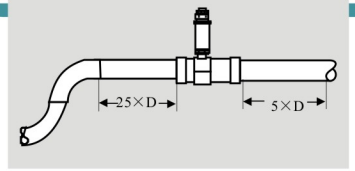

Control valve half-open




Concentric shrinkage wide open valve




Two 90° elbows for one plane




## III. Operation

◆ When sensor is used, the liquid to be measured shall be clean and free of impurities such as fiber and granules.

◆ When sensor is used, it shall be at first slowly filled with liquid, then open the outlet valve (which should be installed behind the flow meter). it is prohibited to render the sensor under impact of high-velocity fluid when it is not filled with liquid.

◆ The maintenance interval for sensor is in general half a year. in case of maintenance and cleaning, attention shall be paid not to damage the parts in the measuring cavity, particularly the impeller. during assembly, watch carefully the positional relation between guide part and impeller.

◆ When the sensor will be out of service for a long time, the internal liquid shall be cleaned. after dried, the sensor shall be provided with protection





sleeves at both ends to protect against dust and it shall be placed in dry conditions for storage.

◆ The associated filter shall be cleaned on regular basis and the internal liquid shall be cleaned when it is out of service for a long time. similar to sensor, the filter shall also be provided with dust protection and stored in dry conditions.

◆ The transmission wire of sensor may be overhead or buried (iron bushing shall be provided in the latter case).

◆ Prior to installation of sensor, the connection thereof with display instrument or oscilloscope shall be finished. then switch on the power, blow the impeller with mouth or move the impeller with hand to make it rotate quickly, see if there is any reading. install the sensor if there is reading. in case of no reading, the related sections shall be inspected to eliminate any fault.

## 1. Parameters

Power Supply: 12-24VDC / 30mA (-20% ~ +15%);

3.6V Lithium battery powered (optional)

**01** Three line 4 ~ 20 mA output current linear correction (Iout and GND circuit load 600 Ω @ 24 V or less).

**02** Programmed pulse output: high level ≥9V (supply voltage -1V); Low level < 0.5V; NPN open collector output with 2K pull-up resistance.

**03** Communication supports RS485 communication of Modbus-RTU protocol.

## 2. Circuit Description

Multi-function turbine flowmeter circuit, whose signal measuring circuit is an adjustable gain amplifying circuit, can cope with a variety of sensors and complex field environment. the filter and protection of the power input are added, and the reliability and anti-power noise capability are improved.

Various parameters can be selected by Chinese/English prompt software menu. after data processing by LCD12864. signal far - transmission circuit can be three - wire 4-20mA output current signal. in addition, a multi-purpose programmable pulse output signal, can be set for a variety of output modes. RS485 communication is also available.

### 2.1 Pulse Output Mode:

A Signal frequency output: direct real-time output of the probe signal frequency, usually used for instrument calibration.

B Calibration frequency output: the output of the real-time monitoring signal after correction according to the flow coefficient

C Frequency output: the frequency after the conversion is output, and the frequency value is calculated linearly according to the 1000Hz output of the full-degree flow.

D Pulse output: output converted pulse, the number of Pulse is calculated according to the cumulative flow of each calculation cycle divided by the pulse equivalent, the maximum of each calculation cycle is allowed to output only 1000 pulses, if the actual number of pulses in the calculation cycle is greater than 1000, the automatic accumulation to the next calculation cycle output; at the minimum, only 4 pulses are allowed to be output per cycle. if the actual number of pulses in the calculation period is less than 4 pulses, it will be automatically accumulated to the output of the next calculation cycle. the effective level of the output pulse is high.





Note: the engineer should set the appropriate pulse equivalent factor according to the current applicable object.

E Upper limit alarm output:higher than the set alarm flow output, when the alarm output transistor leads to the ground is low level; when output transistor is cut off, the pull-up resistance makes the terminal high.

F Lower limit alarm output: lower than the set alarm flow output, when the alarm output transistor conduction to the ground is low level; when the output transistor is cut off, the pull-up resistance makes the terminal high.

### 2.2 Current output:

The current is linear from Iout output 4-20mA to GND, and the output range is [4-22.4]mA. when the instantaneous flow is less than or equal to the lower cut flow, or when the signal frequency is 0, the 4mA current is output. in other cases, the output current value is calculated linearly according to the cut flow output of 4mA and the full flow output of 20mA. if the calculated current value exceeds 22.4mA, the maximum output is 22.4mA.

### 2.3 Modbus communication function:

The transmitter supports communication with Modbus 4800 and 9600 baud rates. through the No.03 command of Modbus-RTU protocol (read and maintain register), the transmitter dynamically reads various parameters of real-time operation of the instrument, and the response time is within 50mS. Modbus continuous command interval minimum 100mS;

### 2.4 Operating environment:

Due to different ambient temperatures, the display response speed of LCD screen also changes. if the LCD refresh speed is too fast at low temperature, the display will not be clear. using the “ambient temperature” option in the engineer menu, set and select the refresh speed of the LCD screen to refresh down to 8 seconds, which can be used at low temperature. -20℃

# 3. Circuit Wiring

### 3.1 Main power supply and output signal terminal (middle 4-bit large hanging frame terminal)

| Iout | GND | Fout | V + |
|---|---|---|---|

| | |
|---|---|
| “Iout” | 4~20mA current output terminal. flow from the output current Iout flowed to the computer or display table of 10-250 Ω sampling resistor, after sampling resistance and negative class, flow back to the power supply “-” side. |
| “GND” | Connect 12-24V power “-”end. |
| “Fout” | The output end of the pulse signal. the output of the flow-related pulse signal is an NPN open collector output containing 2K pull-up resistance. the high level is the power supply voltage of -1V, and the low level is less than 0.5V. namely the VH = Vi - 1; VL < 0.5 V. |
| “V+” | Connect the “+” end of 12-24V power supply. |





### 3.2 Left communication line (2-bit low-end sub)

| B - | A + |
|---|---|

| | |
|---|---|
| “B-” | Connect to the “B-” end of 485 communication. |
| “A+” | Connect the “A+” end of 485 communication. |

### 3.3 Lower battery connection (2-bit low terminal )

| -3V6 | 3V6 + |
|---|---|

| | |
|---|---|
| “−3V6” | Connect 3.6V lithium battery “ - ” terminal. |
| “3V6+” | Connect 3.6V lithium battery “+” terminal. |

Generally, it is recommended to use 3.6V 2# lithium battery; the power consumption of the meter is less than 0.7mA (when there is no RS485), the power consumption is increased by 0.2-0.6mA when there is RS485; A 7Ah 2# lithium battery can be used for more than one year.

The nearby switch only controls whether the 3.6V lithium battery supplies power to the circuit. when It is“ON”, the circuit is connected, or it will cut off the path between the battery and the circuit. the battery power and the external power supply connected to V+ can automatically switch (dual power supplies). when it is battery powered, the current and pulse output signal are automatically cut off, and the output is automatically restored when there is external power.

RS485 communication is allowed when the battery is powered, but in order to

save power consumption, it is recommended to increase the communication interval time.

## 4. Flow Meter Working Interface

The working interface of the flowmeter includes two interfaces, one is the main interface and the other is the auxiliary interface. as shown in figure:

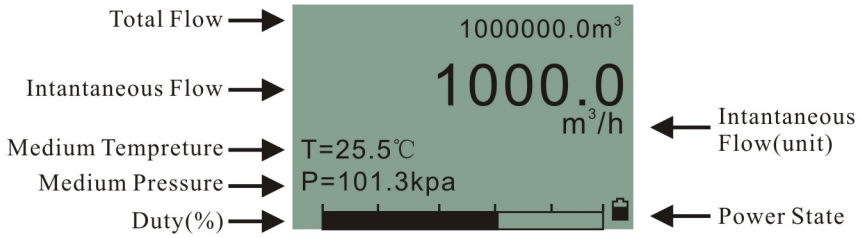



Figure 1 Main Working Interface

The "plug" pattern in the power supply mode indicates that the current power supply is provided; display the "battery" pattern to indicate the current battery power supply

When T temperature and P pressure are shown as "=", it means that the current temperature and pressure are measured values.

When T temperature and P pressure are displayed as "≡", the default value of current temperature and pressure is used. notice that if there is "u" or "d" after T/P, it is necessary to check whether the sensor is abnormal!

When the T temperature identity is "Tu≡", it means the upper limit of the measurement temperature exceeding 500 ℃. at this time, the temperature is fixed to the setting value of "default temperature" in the engineer menu. when T temperature's identity scale is "Td≡", it indicates the lower limit of the measurement temperature exceeding -200 degrees, and then the temperature is fixed to the setting value of "default temperature" in the engineer's menu.

When the identity scale of P pressure is "Pd≡", the measured pressure is lower





than -101.3kPa. at this point, the pressure is fixed to the "default pressure" setting in the engineer menu.

When the identity scale of P pressure is "Pu≡", it means that the measuring pressure exceeds the upper limit by one times the measuring range (the range is the difference between the upper limit of pressure and the lower limit of pressure), then the pressure is fixed to the setting value of "default pressure" in the engineer menu.

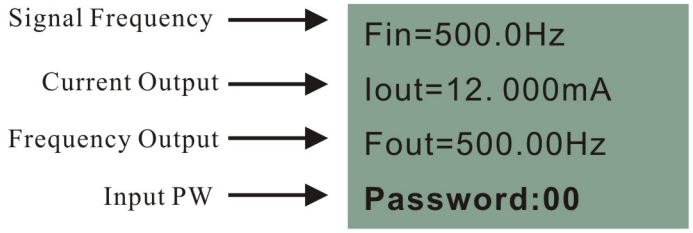



Figure 2 Auxiliary Working Interface

In the auxiliary interface, different names of signal frequency lines represent different running states

▲ Fin - normal signal frequency

▲ FinC5 - the signal belongs to 50Hz noise, the output is cut out, and the flow rate is not calculated

In the auxiliary interface, different names of output frequency lines represent different output states

▲ F_bas - basic signal output, that is according to the measured signal frequency output

▲ F_adj - calibration output, calibration output by multi-point K value detailed algorithm see the following section

▲ F_out - Line frequency output. according to the measured signal, calculate the output signal of a certain frequency.

Signal frequency =(instantaneous flow / full flow) * 1000 (Hz)

▲ Pulse - Pulse output, the number of output pulses calculated according to the "Pulse factor" in the menu

▲ H-AL=0 - high alarm not generated

▲ L-AL=0 - low alarm not generated

▲ H-AL=1 - high alarm is generated

▲ L-AL=1 - low alarm is generated

▲ NO - the current output is invalid

In the auxiliary interface, the value after the output current, in the power supply mode is the actual output current value; fixed display 0.0 in battery power mode (because there is no current output)

Switch between the main interface and the auxiliary interface by pressing the left button and the right button.

Left key is "+ "and "next page", long press to exit. right button is " < "and "page up", long press to enter and confirm.

In the auxiliary interface, long press the right button to enter the password input state. the user can continue to press the left button to select the password number needed for the current input position, and press the right button to move the input cursor position. after typing two-digit passwords, long pressright button to enter the function setting menu corresponding to the password; in the password input state, long press the left button to return to the auxiliary interface and continue to update the display metering value.

About the refresh rate of the main and secondary interfaces. in the engineer menu, there is the setting item of "ambient temperature". in the power-supply mode, if selected, it will refresh once every 1.2 seconds. -10℃ if selected, refresh every 8 seconds; -20℃ in battery mode, refresh every 4 seconds.

## 5. Flowmeter Parameter Setting Menu

The flow meter menu includes four groups: user menu, engineer menu, product menu, and setting menu. among them, the engineer menu must be set by the





operator with professional knowledge to set the menu content. the setup menu and product menu are set and calibrated by the factory when the flow meter goes the field. after leaving the factory, this type of parameter setting must bemodified under the condition of the corresponding equipment, otherwise it will cause the flow meter to measure errors or become invalid.

In the menu, press the right button few seconds to enter the parameter modification state of the selected item, if it is a numeric input type parameter, enter the number through the left button, and move the cursor position with the right button. after the input is completed long press the right button to confirm the input, and the transmitter will automatically update the setting parameters and store them. if the parameter is an option type, scroll up and down the option through left button or right button, after selecting the content long press the right button to confirm, the transmitter will automatically update the setting parameters and store them.

**5.1 Enter the password "22" in the user menu to enter the user menu. the functions and parameters of each menu are as follows**

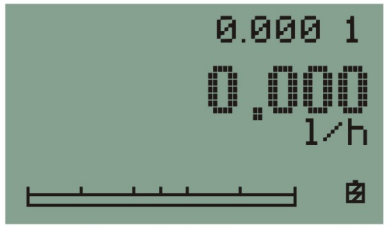
| Number | The name of the menu | Functional specifications |
|---|---|---|
| 1 | Q Unit<br>$m^3/h$ | Set the instantaneous flow unit and select it according to the type of flow algorithm<br>Optional: volume: $m^3/h$; $m^3/m$; L/h; L/m;SG/h; SG/m<br>Quality: t/h; t/m;Kg/h;Kg/m;lb/h;lb/m |
| 2 | Q Mode<br>Qvw actual | The flow algorithm is set and the meter compensates the instantaneous flow according to the algorithm<br>Optional:<br>Qvw actual: Conventional volume flow (flow rate in liquid conditions)<br>Qm: Conventional mass flow (operating condition density must be set)<br>Special Mode: (for user customization) |

| | | |
|---|---|---|
| 3 | K Factor default is 3600.0 | The flow meter coefficient required when calculating the flow rate. the unit is P/$m^3$, (pulse/square) |
| 4 | Density [kg/$m^3$] default is 1000.0 | Suppose the density value of the fluid, unit kg/$m^3$(0 is not allowed) |
| 5 | 20mA default is 1000.0 | Set the instantaneous flow corresponding to the 20mA current output (not allowed to be set to 0). the units are the same as those selected flow unit. |
| 6 | Q cut-Zero default is 0.0% | Set the percentage of full-scale flow occupied by the cut-off flow. when the measured flow rate is lower than this percentage value, the calculated flow rate will be 0 and a 4mA current will be output. |
| 7 | Q Up Al $m^3$/h default is 990.0 | Set the upper limit of alarm flow threshold, when the flow is higher than this value, the output alarm. The unit is the same as the selected unit. |
| 8 | Q Dn Al $m^3$/h default is 10.0 | Set the lower limit of alarm flow threshold, when the flow is lower than this value, the output alarm. the unit is the same as the selected unit. |
| 9 | Damp S [S] default is 4 | Value of 2~32 seconds for display and current output smoothing. the default value is: 4 seconds |
| 10 | Comm Address default is 0 | Set the device address of the Modbus RTU RS485. the default value of range 0-254, the default setting is 0. |
| 11 | Clear Q Enter | Clear the accumulative amount to 0, and the password is: "70" |

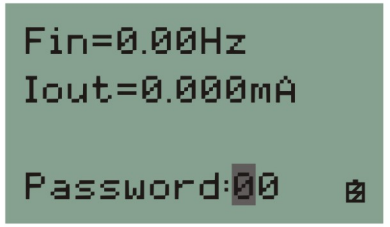




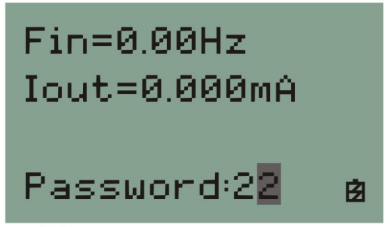
1: Flow rate unit setting.



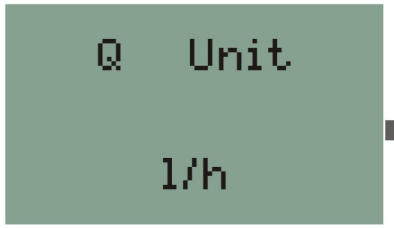

Press the left button and then Press the right button a few seconds to enter.



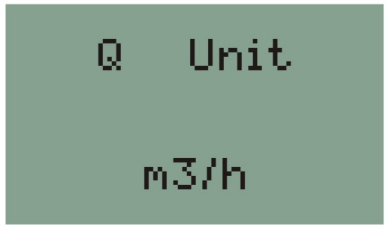

Passward is 22.



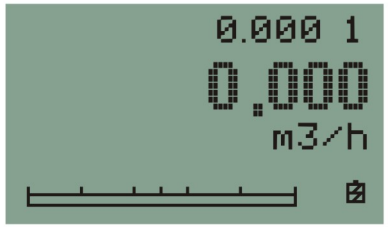

And then press the right button and enter the Q unit.



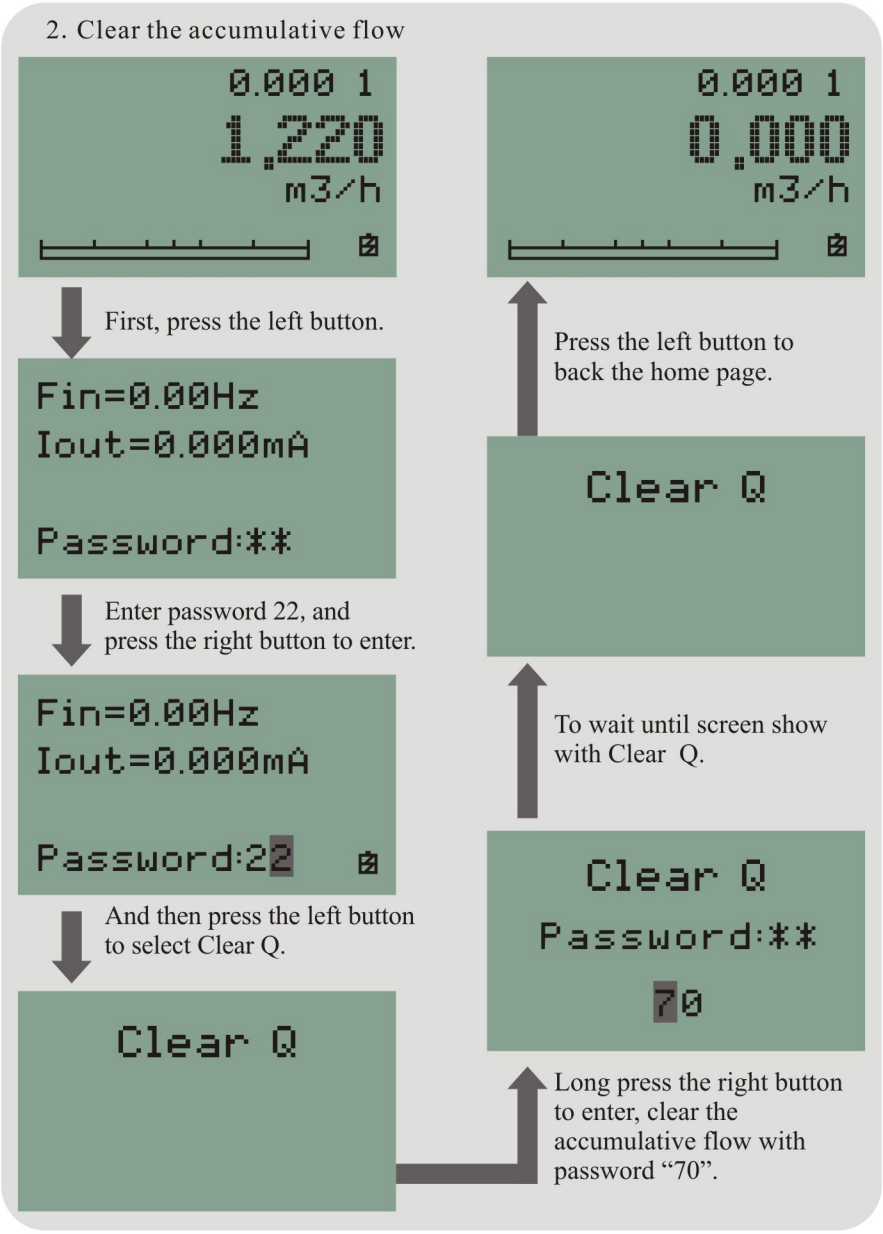

Press the left button, Volume flow unit: $m^3$/h, $m^3$/m, L/h, L/m, SG/h, SG/m
Mass flow unit: t/h, t/m, kg/h, kg/m, lb/h, lb/m
For example, if you need $m^3$/h, press the right button a few seconds to save the selection.




and then press the left button to go back the homepage, the flow unit will display $m^3$/h.



2. Clear the accumulative flow








**5.2 Engineer Menu:**

Password input state, enter "33" password to enter the engineer menu. the function and parameter meanings of each menu are as follows:

| Number | The name of the menu | Functional specifications |
|---|---|---|
| 1 | Language ENGLISH | Set the instrument language type<br>Optional: Chinese; English |
| 2 | Pulse Type F_bas | Select the output type according to the requirements, each output detail key main interface explanation.<br>Optional:<br>F_bas: The signal frequency of the measuring sensor (unmodified)<br>F_adj: Frequency output after correction by 5 point coefficient<br>F_out: Output linear frequency of 0-1000Hz according to flow range<br>Pulse: Accumulates the pulse with output flow of selected pulse factor<br>H-AL: Press the upper limit of alarm to output the signal of alarm switch<br>L-AL: Press lower limit to output alarm switch signal |
| 3 | Pulse Factor default is 0.01 | Valid only for equivalent pulse outputs, meaning how many cumulative flow units per pulse represents<br>Optional: 0.00001; 0.0001; 0.001; 0.01; 0.1; 1.0; 10.0; 100.0 |
| 4 | Comm Param default is 9600,No | Modbus RTU RS485 baud rate.<br>Optional: 4800 Odd; 4800 Even; 4800 No; 9600 Odd; 9600 Even; 9600 No; |
| 5 | Comm. Switch default is on | Set whether Modbus communication function is enabled.<br>Optional: OFF; ON |

| | | |
|---|---|---|
| 6 | P_display default is OFF | Sets whether the fluid pressure is displayed.<br>Optional:<br>Measure: shows the pressure value by the measured pressure signal<br>Deft: "P≡" displays the value of the default pressure item set in the following menu and is used for calculation<br>Calculate: "P≈" shows the pressure of the calculated value<br>Off: no pressure item is displayed |
| 7 | P0-Ref P0=[kPa] default is 101.32 | Set the pressure value at the reference end, which is used for the high-altitude correction when the gauge pressure sensor calculates the absolute pressure.<br>The absolute pressure sensor should be set to 0.0KPa |
| 8 | Tn [℃] default is 0.0℃ | Set the calculation value of the standard temperature.<br>Optional: 0℃; 20℃ |
| 9 | Environ-T default is -10℃ | For different environments to select the LCD refresh rate. Optional:<br>-10℃: when "-10℃" is selected in normal environment, the working interface will refresh every 1.2 seconds<br>-20℃: when the low temperature environment is set "-20℃", the working interface will refresh every 6 seconds |
| 10 | Flow correction factor, default C is 1.00 | Flow percentage Qi range 0~120%; flow coefficient Ci range 0.8~1.2 (Ci= standard flow/measured flow)<br>Note: 5 point correction, when making the traffic correction each percentage point increases, and can only occur once, Ci default to 1.0 |

Table 1 Function Description of Engineer Menu





**5.3 Modbus Communication**

According to MODBUS-RTU communication protocol, the three-wire transmitter can quickly read the operation parameters in the maintenance register. the Modbus command that reads and maintains the register value is command No.03. Only 4800 and 9600 baud rates are supported, and the response time is within 50mS. Modbus continuous command interval minimum 100 mS.

Table 2 is the offset address and data format of each value in the Modbus

| Address Offset | Action Object | Data Format | The Number of Data Bytes |
|---|---|---|---|
| 0 | The instantaneous flow | Floating point type | 4 |
| 4 | Flow at working condition | Floating point type | 4 |
| 8 | Accumulator low | Integer type | 4 |
| 12 | Accumulator high | Integer type | 4 |
| 16 | Fluid temperature | Floating point type | 4 |
| 20 | Fluid pressure | Floating point type | 4 |
| 24 | Measure frequency | Floating point type | 4 |
| 28 | Output current | Floating point type | 4 |
| 32 | Instantaneous flow unit code | Short integer type | 2 |

Table 2 Modbus Read Hold register Command Resolution

As for the cumulant, the cumulant consists of high and low parts. the low part of the cumulant is a fixed-point integer. after the data is converted to base 10, the high part of the cumulant is the integer value of the cumulant divided by the quotient of 1000,000. the calculation formula is:

Cumulant (floating point) = high cumulant (integer) * 1000000.0 + low cumulant (integer) / 1000.0

The accumulative flow unit is the instantaneous flow unit.

For the flow unit code, the flow unit is the physical unit obtained by the flow unit code value with 0-7 or 0-11.

For details of Modbus command and message format, please refer to protocol specification such as Modbus white paper.

## 5.4 FAQ

### 5.4.1 Flow correction coefficient and flow coefficient correction:

Flow correction coefficient is in the flow calculation according to the basic formula to calculate the working condition of the flow by the flow correction coefficient to calculate the correction. the correction coefficient is usually set as the percentage of the target relative to the full-degree flow. correction coefficient C= standard flow/measured flow value without correction. the points are interpolated linearly. without correction, C=1, and the correction value is limited to the range of 0.8-1.2. Only for flow and linear frequency and current.

Flow coefficient correction is the linear correction calculation of flow meter coefficient. the correction usually first sets the average instrument coefficient K in the user menu, and then sets the frequency point to the calibration frequency of the instrument according to the standard fixed point. input the flow coefficient of the corresponding frequency point. the points are normalized to the average instrument coefficient by linear interpolation. set “off” when not corrected. effective for correction of frequency and flow and linear frequency and current.





### 5.4.2 Pulse output type and usage:

The signal pulse in the pulse output type is to track the output of the original signal pulse and is usually used for initial calibration. the correction frequency is the corrected signal frequency output linearly corrected according to the flow coefficient. the linear frequency output of 0-1000hz is the output frequency corresponding to the instantaneous flow rate, and the output frequency is 1000Hz at the full flow rate. the correction coefficient C value linear correction and compensation calculation are effective for the frequency output, which is usually used to measure the computer channel of frequency input. the pulse output is calculated according to the cumulative flow, and there are maximum and minimum limits on the output value of each calculation period.

### 5.4.3 Pulse equivalent:

The pulse equivalent is the output factor and its value is the flow unit/pulse. that is, how many units of flow does each pulse represent? Its value must be kept within 1000 pulses per measurement period.

### 5.4.4 Selection of ambient temperature:

Due to the LCD screen responds slowly at low temperatures, it can't be seen clearly, so when the environment is lower -10℃, you can choose -20℃ to make the screen update about 6 seconds, so that the low temperature can see the data. at higher -10℃ you can optionally -10℃ restore the display to the normal update interval of 2 seconds.

### 5.4.5 Calibration of output current:

For the calibration of output current, the standard ammeter shall be connected to the current circuit in series. after the corresponding mA item is confirmed by pressing the “E” key, the current output of approximate value shall be obtained. at this time, the calibration shall be completed after the actual display value of ammeter is input and confirmed. 4/12/20 Usually three calibration points should be carried out each time.

## 6. Wiring Diagram