aobo
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Handbook

ABDT-LWGY Liquid Turbine Flowmeter

» Flange Connection

» Thread Connection

» Clamp Connection

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CONTENTS

I. Product Overview

The liquid turbine flowmeter is a speed-type instrument, which has the advantages of simple structure, small volume, high accuracy, sensitive reaction and convenient installation and maintenance. It is used for measuring volume flow and accumulation of low viscosity, non-corrosive and clean liquids in closed pipes. If it is matched with the display instrument with special functions, it can also carry out quantitative control, over-limit alarm and so on. It is an ideal instrument for flow measurement and energy saving.

It can be widely used in petroleum, chemical industry, metallurgy, organic liquid, inorganic liquid, liquefied gas, urban gas pipe network, pharmaceutical, food, paper making and other industries.

This product complies with the production execution standard JB/T9246-2016 for turbine flowmeters, and its inspection is carried out in accordance with the verification regulation JJG1037-2008 for turbine flowmeters.

II. Product Characteristics

(1) High precision, generally up to±1%R, ±0.5%R, and high precision type up to±0.2%R;

(2) It has good repeatability and short-term repeatability can reach 0.05% -0.2%. It is due to good repeatability, normal calibration or online calibration can get extremely high accuracy, which is the preferred flowmeter in trade settlement;

(3) It outputs a 4-20mA signal and it can be connected with DCS to achieve intelligent control;

(4) It outputs pulse frequency signal, and it is suitable for total measurement and connection with the computer, without zero drift and strong anti-interference ability;

(5) Original pulse frequency range (10Hz-1.5KHz), with strong signal resolution;

(6) The range ratio is wide and the maximum range ratio reaches 1:20;

(7) Compact and light structure, convenient installation and maintenance and large circulation capacity;

(8) It is applicable to high pressure measurement.

III. Operational Principle

Fig.1 shows a brief diagram of the liquid turbine flow sensor structure. It is shown from the figure, when the measured liquid flows through the sensor, the impeller is rotated by the liquid. Its rotational speed is proportional to the pipeline average flow speed and the rotation of the impeller periodically changes the magnetoresistance value of the magnetoelectric converter. The magnetic flux in the detection coil changes periodically, producing a periodic induction potential, that is, the electric pulse signal and it is sent to the display instrument after amplification.

Figure 1

IV. Technical Parameter(s)

Table 1

Measured medium	No impurities, low viscosity, no strong corrosive liquid
Instrument caliber and connection mode	Thread connection for 4, 6, 10, 15, 20, 25, 32 and 40 Integrated flange or wafer connection for (15, 20, 25, 32, 40) 50, 65, 80, 100, 125, 150, 200; Clamp-on connection: (4,6,10,15,20,25,32,40),50,65,80,100
Accuracy grade	Pipe-segment type: 1.5%, 1%, 0.5%, 0.2% (specially made)
Range ratio	1:10-1:20

Verification conditions	Verification device	Liquid flow verification device based on master meter method		
		Liquid flow verification device based on static mass method		
	Ambient conditions	Ambient temperature	20℃	
		Relative humidity	65%	
Operating conditions	Medium temperature（No freezing, no condensation）	T1(General, standard)	-20℃~+80℃	
		T2(high-temperature type, custom-made)	-20℃~+120℃	
		T3(high-temperature type, custom-made)	-20℃~+150℃	
	Ambient temperature	-20℃~+60℃	Relative humidity	5%-90%
	Atmospheric pressure	86KPa~106KPa		

V. Caliber-Flow Comparison Table

Table 2

Caliber (mm)	Regular flow range (m^3/h)	Extended flow range (m^3/h)
	Pipe-segment type	Pipe-segment type
DN4	0.04-0.25	0.04-0.4
DN6	0.1-0.6	0.06-0.6
DN8	0.15-0.9	0.1-1
DN10	0.2-1.2	0.15-1.5
DN15	0.6-6	0.4-8
DN20	0.8-8	0.45-9
DN25	1-10	0.5-10
DN32	1.5-15	0.8-15
DN40	2-20	1-20
DN50	4-40	2-40
DN65	7-70	4-70
DN80	10-100	5-100
DN100	20-200	10-200

DN125	25-250	13-250
DN150	30-300	15-300
DN200	80-800	40-800

VI. Converter Operating Instructions

6.1 A model converter operation instructions

The meter is operated by keypad, and there are some parameters need to be set when installing.

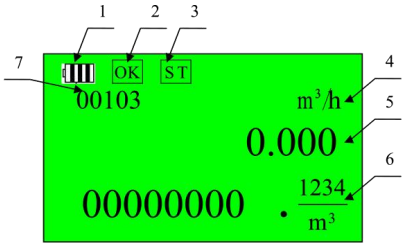
There are three keys: F1, F2 and F3 from left to right. F1 is Shift Key, F2 is Enter/Next Key, and F3 is Modify/Return Key. (If there are some special functions of keys, please follow the instruction below the LCD)

When the system is running, You can manually switch to the Main Interface 2 by using the F3 key.The content displayed on Main Interface 2 is essentially the same as that on Main Interface 1, except that the instantaneous flow is replaced by the working condition flow.

6.1.1 Power on

After powering on, the meter will do self-checking.

If the system is abnormal after self-checking, the meter will display the interface of error self-checking (Details in self-test menu). 1~2 seconds later, the meter will enter the main screen 1 automatically.If the system is normal, the meter will enter the main screen 1 directly. The main screen 1 is shown as below:



Main screen 1

Main Screen 1:

1.Indicator of running modes. It displays the battery voltage in battery mode, displays "II" in two-wire current mode, and displays "III" in three-wire mode.

2.The running status of meter. If the system of meter is working well, it displays "OK". Otherwise it displays "ERR".

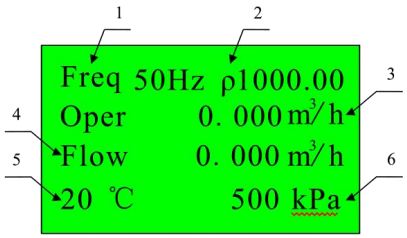
3.Indicator of temperature. If the system of meter is abnormal or the temperature is manually set, it displays "ST". If they are temperature sensors and the temperature sensors are working well, it will be blank. (The temperature range is -50℃ ~ +300℃)

4.Flow unit:The instantaneous flow unit, it is configurable.

5.Flow rate. Display the instantaneous flow. The maximum value is 9999 999.

6.Total flow. Display the total flow. The maximum value display 9999 9999.9, the unit is t.

7.Display of meter communication status information: The status information is displayed as a five-digit code.The first three digits represent the meter number.The fourth digit represents the parity bit, 0: No parity; 1: Odd parity; 2: Even parity; The fifth digit represents the baud rate, 0: 1200; 1: 2400; 2: 4800; 3: 9600. Example: For a meter with number 1, no parity, and a baud rate of 9600, the status line on the display shows "00103".



Main screen 2

Main Screen 2:

1.Freq 50Hz: Display the running frequency of sensor, the maximum value is 9999.

2. ρ 1000 .00:Density of the medium , the instrument measures the mass of the medium as a liquid when the display sets the density of the medium.

3.Oper 0.000m^3/h: Flow rate in working condition, the maximum value is 9999999.

4.Flow 0.000m^3/h: Flow rate in standard condition, the maximum value is 9999999.

5.20℃:It displays the setting temperature.

6.500 kPa:It displays the setting pressure.

6.1.2 Main Menu (Figure 2 .Figure2-1)

In the main screen 1, main screen 2, press F2 key to enter main menu, press F1 Shift key

to select sub-menu, and then press F2 to enter.

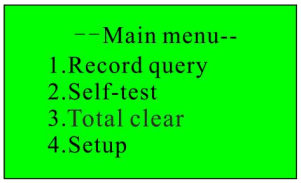


Figure 2

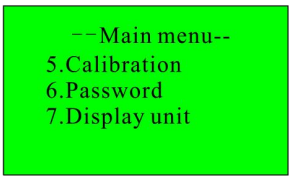


Figure 2-1

For the operation of each menu item, please refer to the corresponding sections below. A brief description is as follows:

1)Record query: Query the operation record of meter,including daily,monthly and yearly records(Figure 3).

2)Self-test: Check the running status of meter.

3)Reset: Reset total flow.

4)Setup: Set the operating parameters of meter.

5)Calibration: Set the parameters of temperature, pressure, current output and flow coefficient.

6)Password: Modify the passwords of setup, total reset and calibration.

7)Display unit: Change the display unit of flow, temperature and pressure.

Figure 3

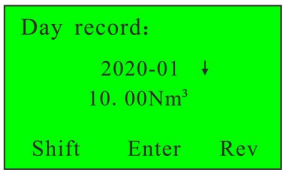


Figure 4

6.1.3 Record query

In Record query menu, users able to view all the operation records by day, month and year basis.

Day records query: On the Record Query interface,press F1 key to move the cursor to "Day Record", then press the F2 key to enter the Day Record query (as shown in Figure 4).

To view the day record menu, press F1 to move the cursor position and press F3 to modify the date, allowing you to query the required data. When the arrow points down, the number decreases; when the arrow points up, the number increases. The “10.00 Nm^3” below

indicates the cumulative flow for January 1, 2020.

Month Record Query: On the record query interface, press F1 key to move the cursor to "Monthly Records", then press F2 key to enter the monthly record query interface(as shown in Figure 5).

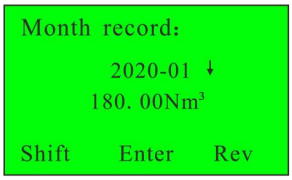


Figure 5

Figure 6

Year Record Query: On the record query interface, press F1 key to move the cursor to the "Yearly Record", then press F2 key to enter the annual record query interface (as shown in Figure 6).

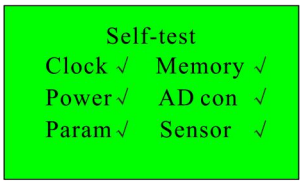


Figure7

6.1.4 Self-test (Figure 7)

If the system of meter is abnormal, enter this menu to check the details of running status, " √ " is ok, and "×" means this option is abnormal.

In addition, after powering on, the meter will do self-checking. If there are one or some abnormal options, the meter will display the self-test interface. When the meter is running, you also can enter this menu to check the running status of meter (as shown in Figure 7).

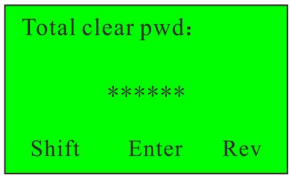


Figure 8

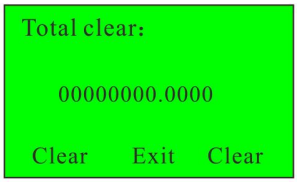


Figure 8-1

6.1.5 Total reset (Figure 8,Figure 8-1)

Quick clear of total flow: In order to prevent unauthorized operation or wrong operation,

it needs to input password before total reset.

On the password checking interface(as shown in Figure 8), enter the correct password using the shift key, then press F2 confirmation key to enter the clear interface, where the current accumulated flow value is displayed. In the clear interface, to prevent wrong operation, a two-hand operation is required that simultaneously press the F1 and F3 keys to perform the clearing operation. Upon successful clearing, the screen will display "00000000.0000"(as shown in Figure 8-1). Press F2 return key to exit the clear interface and return to the main interface.

6.1.6 Setup

In Setup menu, it can set the operation parameters of meter.

In order to prevent unauthorized operation or wrong operation, it needs to input password(Factory default is 00000) before entering this menu(as shown in Figure 9).

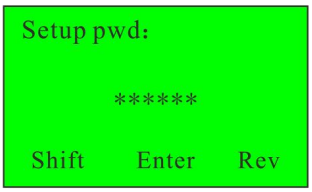


Figure 9

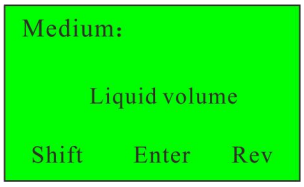


Figure 9-1

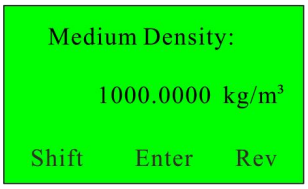


Figure 10

Medium Selection: Use this interface to modify the measurement medium for the instrument. The following media are available for selection (as shown in Figure 9-1):

1. Liquid Volume 2. Liquid Mass

Medium Density: Set the density of the measured medium at 20°C. Please note the density unit when setting (as shown in Figure 10).

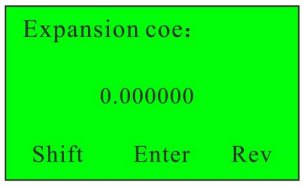


Figure 11

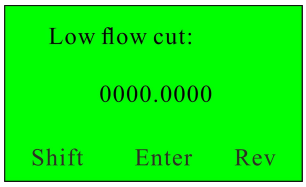


Figure 12

Expansion coe: Volumetric expansion coefficient. Use this parameter to correct the density when measuring liquids (as shown in Figure 11).

Low flow cut: Low flow cut-off. The low flow cut-off function is used for anti-interference.

When the flow signal is lower than the set value due to interference, the instrument automatically sets the flow to zero. This setting helps to better suppress low-frequency interference (as shown in Figure 12).

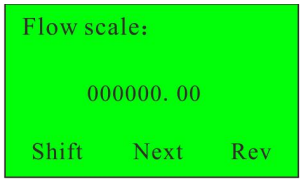


Figure 13

Figure 14

Flow scale: Set the maximum flow, and this value is the corresponding value of 20mA when there is 4-20mA output.(Figure 13)

Damping time:Input range of damping time is 0-9. (Figure 14).

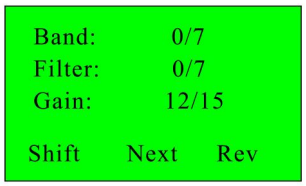


Figure 15

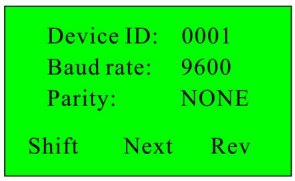


Figure 16

Band (Frequency band adjustment), Filter(Filtering adjustment) and Gain (Gain adjustment). Using these three parameters accurately can make the meter working in the best performance (Do not adjust by non-professional personnel) (as shown in Figure 15).

RS485 Communication related settings: Set the instrument communication address, baud rate, Parity of RS485 communication.(Figure 16)

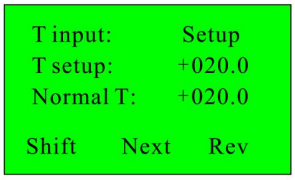


Figure 17

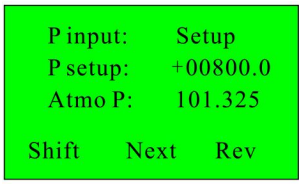


Figure 18

Temperature Parameter Settings (as shown in Figure 17):

T input: Temperature input. Acquisition method of temperature signal and temperature setup. Temperature input offers two options: "Sensor" and "Setup". When "Setup" is chosen, the instrument does not use a sensor for temperature acquisition during flow calculation. The set temperature is used for flow calculation when the sensor reading is excessively high or fails. The standard condition temperature is the reference temperature used for

converting volumetric flow rate from operating conditions. Unless otherwise specified, it is typically set to 20°C.

T setup: Temperature setup. The temperature range is from -999.9 to 999.9, and the unit is ℃. If the acquisition method of temperature signal is "setup", the meter flow will be compensated based on the set temperature

Normal T: Standard condition temperature.This is a reference temperature used in calculations when measuring gas.

Pressure Parameter Settings (as shown in Figure 18):

P input(Pressure input): Selection of pressure type input. It can select "setup" or "sensor". If selecting "setup", the meter flow will be compensated by the setting pressure.

P Setup: Pressure setup value, and it is absolute pressure of the instrument operation parameters. Unit is KPa.

Atmo P: Atmosphere pressure. Set as the average atmosphere pressure in local. Use this value to calculate flow. Unit is KPa.

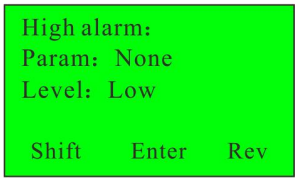


Figure 19

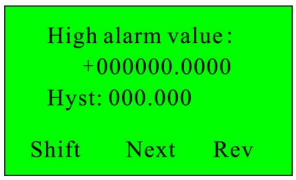


Figure 20

High Alarm: Upper limit alarm. The variable for setting the upper limit alarm and the level for setting the alarm output are the same (as shown in Figure 19) (This function is currently not supported by the HART board).

High Alarm Value:Upper limit alarm value.Set the upper limit alarm value and the hysteresis value (This function is currently not supported by the HART board) (as shown in Figure 20).

Hyst:Hysteresis Value.To prevent control oscillation when the current alarm variable fluctuates near the upper limit alarm's critical control value, setting a hysteresis value can confine the oscillation within an acceptable range, albeit with a slight reduction in control precision. Set this value based on field conditions and experience.

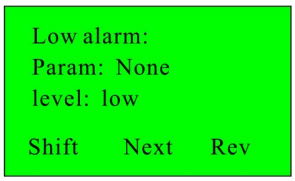


Figure 21

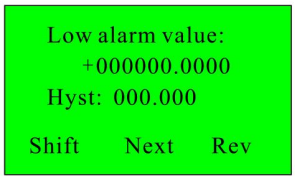


Figure 22

Low alarm: lower limit alarm. Set the lower limit alarm parameters(This function is currently not supported by the HART board)(as shown in Figure 21).

Low alarm value:Lower limit alarm value. Refer to the upper limit alarm value setting. (This function is currently not supported by the HART board)(as shown in Figure 22).

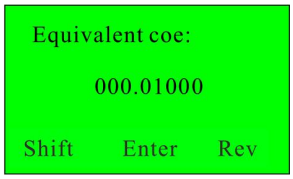


Figure 23

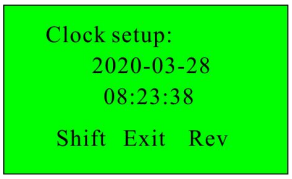


Figure 24

Equivalent coe:Equivalent coefficient.The equivalent refers to a quantity corresponding to a specific or conventional value. This parameter converts the standard flow rate into an equivalent pulse output (as shown in Figure 23).

The unit is m^3/p, where m^3 stands for cubic meter and p stands for pulse.

Clock Setup: Calibrates the current date and time in operation. This parameter is calibrated at the factory. Clock settings affect data calculations; it must be set to the current date before operation. Incorrect settings may cause confusion in record storage (as shown in Figure 24).

6.1.7 Calibration

Configure the necessary parameters for instrument correction. These parameters are engineering-level settings. In order to prevent unauthorized operation or wrong operation, it needs to input password(Factory default is 00000) before entering this menu(as shown in Figure 25). After entering the correct password, you will enter the calibration option selection interface.There are four options available:Temperature channel,Pressure channel,Current output and Flow coefficient. Press F1 Shift key to select options(Figure 25-1).

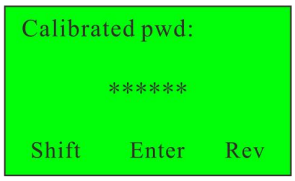


Figure 25

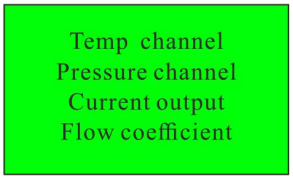


Figure 25-1

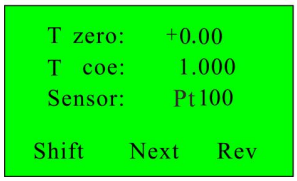


Figure 26

Calibration Channel Selection: On this interface, use shift key to select the channel to be configured (as shown in Figure 25-1).

Temperature channel: Input correction coefficient and sensor type to correct the temperature which is collected by temperature sensor. If the collection mode of temperature signal is temperature setup, there is no need to set these parameters.(Figure 26)

T Zero:Temperature zero point.The temperature used for flow calculation is the temperature collected by the sensor plus this value (as shown in Figure 26).

T coe: Temperature coefficient. A parameter for applying a multiplicative correction to the temperature. If no correction is required, set this value to 1.

Sensor:Temperature sensor type. Currently, Pt100 and Pt1000 are available for selection.

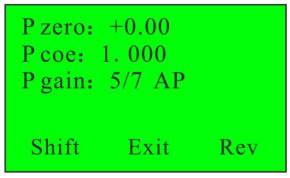


Figure 27

Pressure channel: Input correction coefficient to correct the pressure which is collected by pressure sensor. If the collection mode of pressure signal is pressure setup, there is no need to set these parameters (as shown in Figure 27).

P Zero: Pressure zero.The calculating pressure is the pressure collected by pressure sensor adding P zero(as shown in Figure 27).

P coe: Pressure coefficient. A correction parameter for applying multiplicative compensation to the currently acquired pressure. If no correction is required, set this value to 1(as shown in Figure 27).

P gain: Pressure gain. The amplification factor applied to the signal when acquiring data from the pressure sensor(as shown in Figure 27).

GP/AP: Gauge/absolute pressure.Sets the sensor type. "AP" indicates the instrument is

connected to an absolute pressure sensor, while "GP" indicates connection to a gauge pressure sensor.

Figure 28

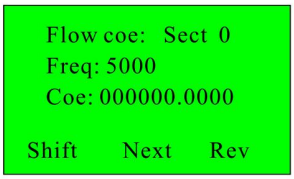


Figure 29

I zero: Current Zero Point. Adjusts the output zero point of the current by entering correction parameters.

Note: Modifying this parameter will disable the current output.Therefore, if the current output is in use, please don't modify this parameter. (as shown in Figure 28).

Flow Coefficient:

Flow coe: Flow coefficient segmentation: Configure the flow coefficient in segments. The number of segments is 0-9 (as shown in Figure 29).

Freq: Frequency.The segment frequency, the input range is 0-9999.

Coe: Coefficient. The flow coefficient corresponding to the segment frequency.

After calibration using a flow calibration device, input the segment frequencies and their corresponding coefficients in ascending order (segment 0 is the smallest).

Note: If not all 10 segments are used, in the segment immediately following the last calibrated segment, set the frequency to 5000 and the coefficient to the same value as that of the last calibrated segment.

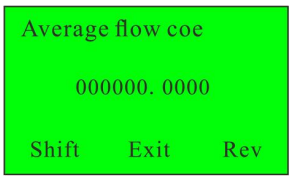


Figure 30

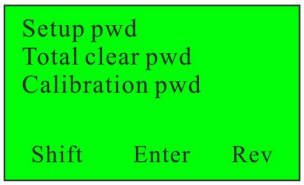


Figure31

Press F2 Next key to enter the average flow coefficient (as shown in Figure 30).

Average flow coe: Average flow coefficient. It is used for non-linearity correction. When the coefficients of section close up to the average flow coefficient, then it can reduce the nonlinear error greatly, and improve the accuracy of meter (as shown in Figure 30).

6.1.8 Password

In this menu, it can modify the password of total reset, setup and calibration separately. (Figure 31). The procedure for modifying there passwords is identical.The following describes only the process for changing the settings password.

Enter the password modification selection interface,choose the item to modify (as shown in Figure 31-1, Figure31-2, Figure31-3), then enter the old password. Next, input the new password in the new password field and press F2 confirm key. If the old password is correct, a "Modification Successful" prompt will appear. After the prompt at the bottom indicates success, the interface will automatically return to Main Interface1. Otherwise, a "Modification Failed" message will be displayed, and it will also return to Main Interface 1.

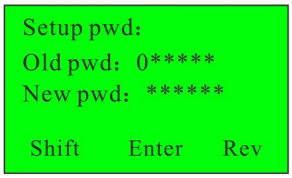


Figure 31-1

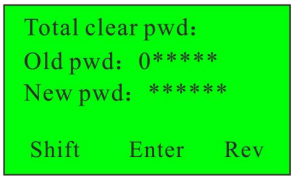


Figure31-2

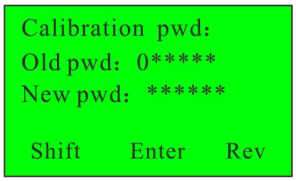


Figure31-3

Setup pwd: Password Modification. Use the shift key to select the password setting for the corresponding module (as shown in Figure 31-1, Figure31-2, Figure31-3).

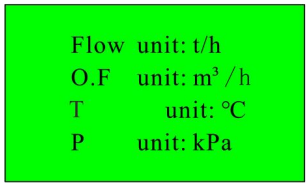


Figure 32

6.1.9 Display unit

Flow unit: Standard Condition Unit. Selection of units for instantaneous or standard condition flow.

O.F.: Working Condition Unit.Selection of units for working condition flow.

T unit: Temperature Unit. Selection of temperature units.

P unit: Pressure Unit. Selection of pressure units.

The Display Unit options allow you to change the units displayed during instrument

operation. Upon entering the Display Unit interface:

For Standard Condition Flow:

If set to Liquid Mass, choose from four options: t/h, t/min, kg/h, kg/min.

If set to Liquid Volume, choose from four options: m^3/h, m^3/min, L/h, L/min.

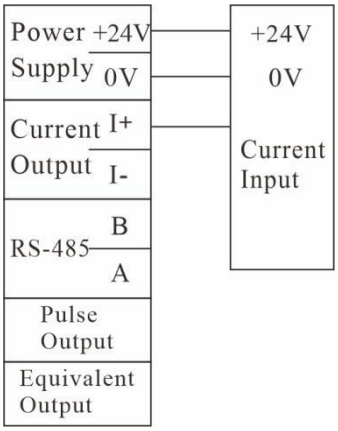
For Working Condition Flow, choose from four options: m^3/h, m^3/min, L/h, L/min.

After selecting the desired units, press the confirmation key. The main interface will then display numerical values using the set units (as shown in Figure 32).

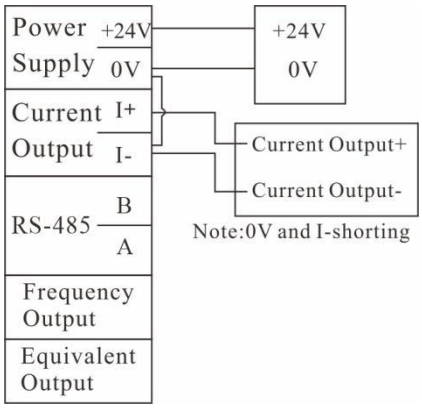
6.1.10 Wiring (Type A)

1. Output Terminal Description and Wiring Method (DC24V Power Supply Wiring Method)

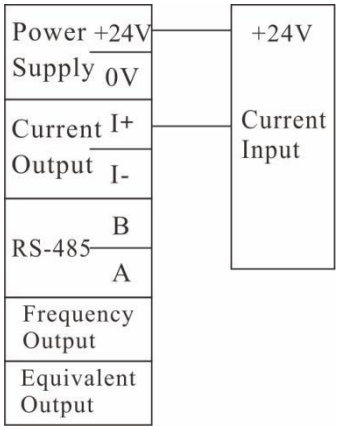
a. Three-Wire Current Output Wiring



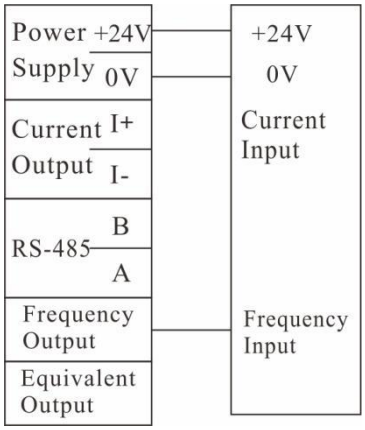
b. Four-Wire Current Output Wiring



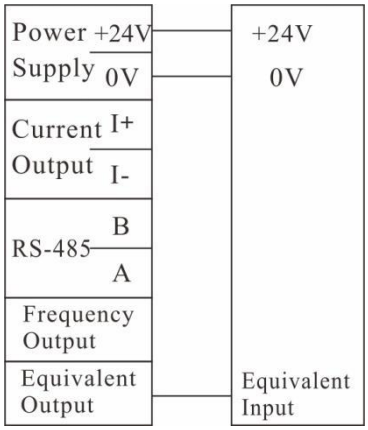
c. Two-wire current wiring (sensor signal output):



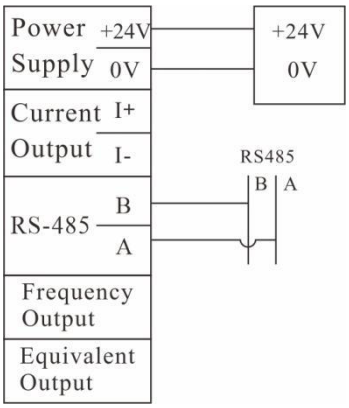
d. Three-wire frequency wiring:



e.Three-wire equivalent wiring(Cumulative flow signal output):

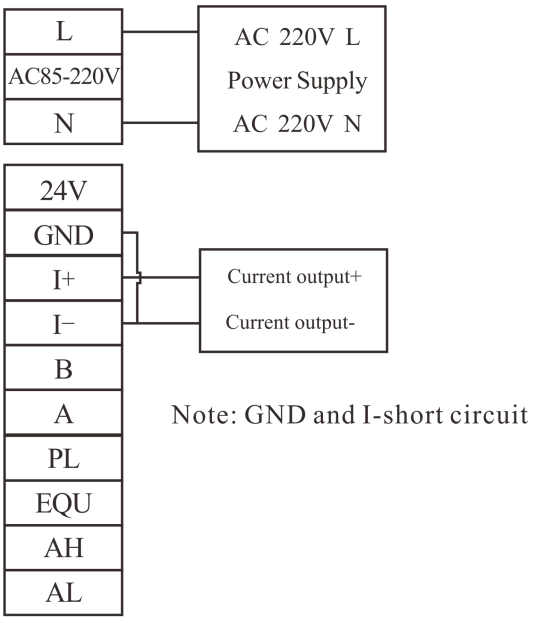


f.The wiring of RS485 output

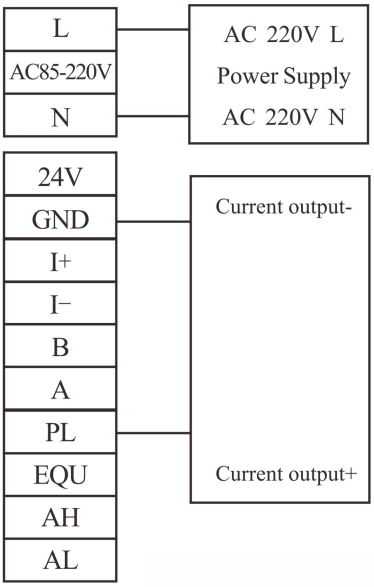


2. Output Terminal Description and Wiring Method (AC220V Power Supply Wiring Method)

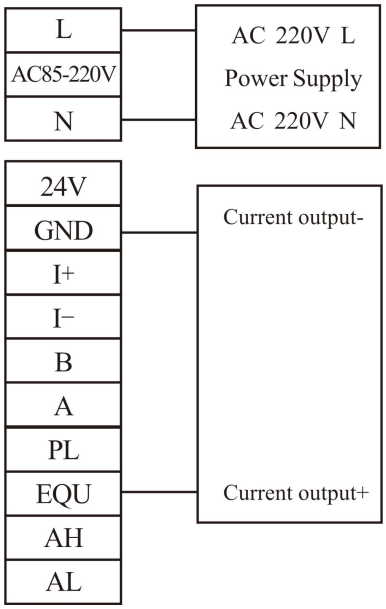
a.4-20mA Current Output Wiring：



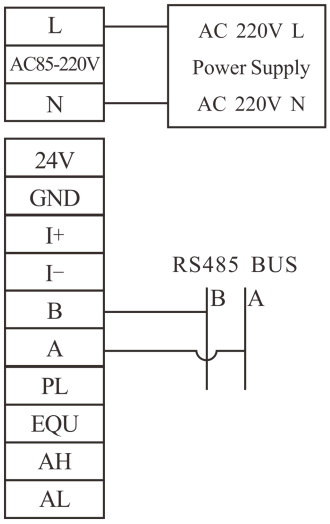
b.Pulse Output wiring (Sensor signal output)：



c. Equivalent Pulse Output wiring (Cumulative flow signal output)



d. RS-485 Communication Output Wiring



6.2 Key Definitions (Type B)

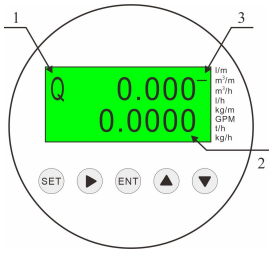
The device parameters are configured using the keys. Typically, manual setting of the corresponding parameters via the keys is required during installation. The device has five keys, arranged from left to right as follows: Setting, Shift, Confirm, Up, and Down. When using them, please refer to the key function prompts displayed at the bottom of the LCD screen (Main Interface 3).

Main interface3:

First line: Q instantaneous flow

Second line: Accumulative flow

Right "-": corresponds to the instantaneous flow unit



Main screen 3

Press “Shift” key once to display the frequency interface. Press “Shift” key again to switch back to the main interface.

Key Definition

Table 3

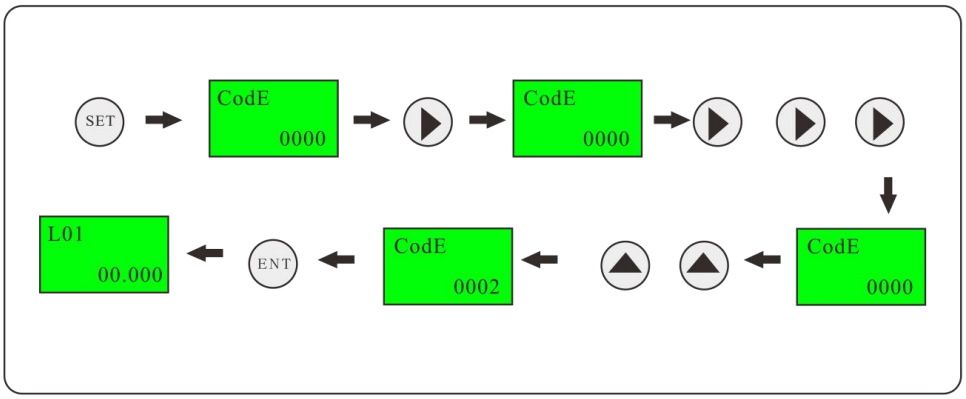
Name		Description
Operating Key	SET	1. In the measurement state, press it once to enter the setting state. 2. In the set state,when the parameter symbols are displayed,press it once to enter the next set of parameters or return to the measurement state.

		1. In the measurement state, Switch instantaneous flow and frequency to display 2.In the set state:display the stored parameter value and move the cursor to the modified digit.
		1. Key is invalid in the measurement state. 2. In the set state,save the modified parameter values, or check the next set of parameters
		1.Key is invalid in the measurement state. 2.In the set state, add parameter value or change the set parameter type.
		1.Key is invalid in the measurement state. 2.In the set state, reduce the parameter value or change the set parameter type.

6.2.1 Setting Method

Press "Set" button to enter the password input interface. Press "Shift" button to move the cursor position. Press "Up" button to increase the number by 1, and press the "Down" button to decrement the number by 1. After entering the password, press the "ENT" button to enter the menu.

For example: The process to enter the first-level menu is as follows (default password 0002):



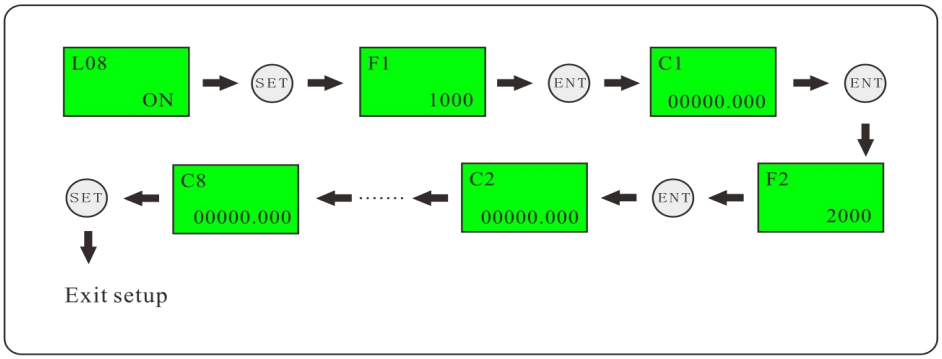
In the menu interface, press "ENT" key to cycle through the menu pages. To modify a value, press "Shift" key under the corresponding menu item. The corresponding cursor will flash. Then press "Up" or "Down" key to adjust the value. After finishing changes, press the "ENT" key to save.

First level menu(Default password:0002):

Table 4

L01	Instantaneous flow decimal point position 0 ~ 4. The order of 0 to 4 corresponds to 0.0000, 00.000, 000.00, 0000.0, 00000. This item can not be set up.
L02	Flow coefficient decimal point position 0 ~ 4. 0 to 4 orders corresponds to 0.0000, 00.000, 000.00, 0000.0, 00000. This item does not care.
L03	Sensor flow coefficient, unit: 1/ l.
L04	The density of the medium, the unit: t/m^3, the default is 1.000; this can be used as the flow correction factor.
L05	Instantaneous flow measurement unit: 0 ~ 3. 0:l/m； 1:m^3/min； 2:m^3/h； 3:l/h。
L06	Filter time setting (s): 1 ~ 20, the default is set to 1;
L07	Small signal cutoff value 0~ 9999. Default is 0, Don't open small signal cutoff function, according to the actual situation, removal of a small flow rate value.
L08	Broken line correction function selection: 1: ON; 0: OFF, the default is OFF; do not open the broken line correction function. Non-factory staff can not modify the parameters.
L09	4-20mA current output range setting; It will be debugged when power is DC24V. Dry battery powered no this item).

If" L08 "is set to "ON", press "set" key to enter the segment frequency and segment coefficient modification. If the L08 is set to "OFF", press "set" key to exit the settings.



Broken-line correction menu:

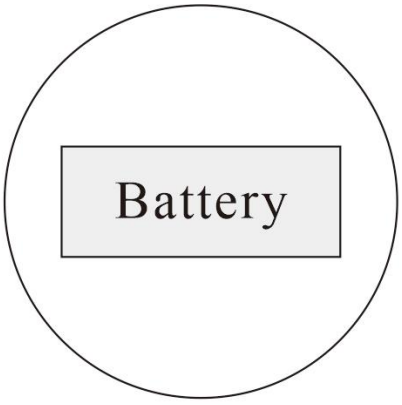
Table 5

F1	The first segment frequency value (Hz) of the turbine flow sensor, minimum;
C1	The first segment flow coefficient for the turbine flow sensor (1/ L);
F2	The second segment frequency value of the turbine flow sensor (Hz) ;
C2	The second segment flow coefficient of turbine flow sensor (1/ L);
F3	The third segment frequency value of the turbine flow sensor(Hz);
C3	The third segment flow coefficient of the turbine flow sensor (1/ L);

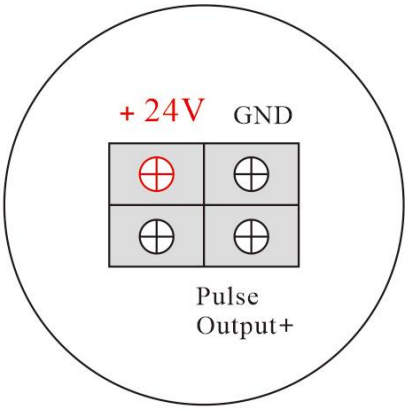
F4	The fourth segment frequency value of the turbine flow sensor(Hz) ;
C4	The fourth segment flow coefficient of the turbine flow sensor (1/ L);
F5	The fifth segment frequency value of the turbine flow sensor (Hz);
C5	The fifth segment flow coefficient of the turbine flow sensor (1/ L);
F6	The sixth segment frequency value of the turbine flow sensor (Hz);
C6	The sixth segment flow coefficient of the turbine flow sensor (1/ L);
F7	The seventh segment frequency value of the turbine flow sensor(Hz) ;
C7	The seventh segment flow coefficient of the turbine flow sensor (1/ L);
F8	The eighth segment frequency value of the turbine flow sensor(Hz);
C8	The eighth segment flow coefficient of the turbine flow sensor (1/ L),maximum.

6.2.2 Wiring diagram(wire accordingly only if the corresponding function is available)

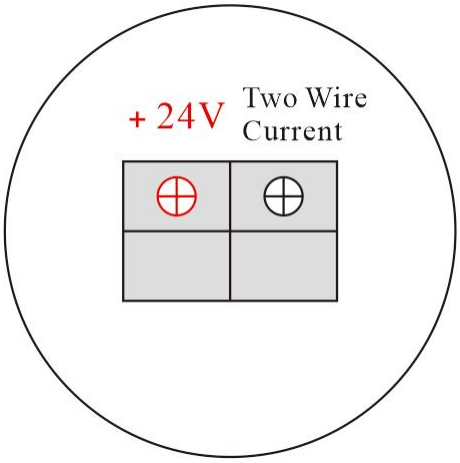
a. Lithium Battery power, No output; local display;



b.DC24V pulse output:

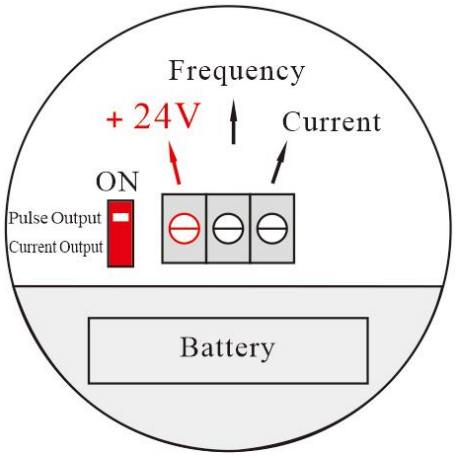


c.DC24V current output:



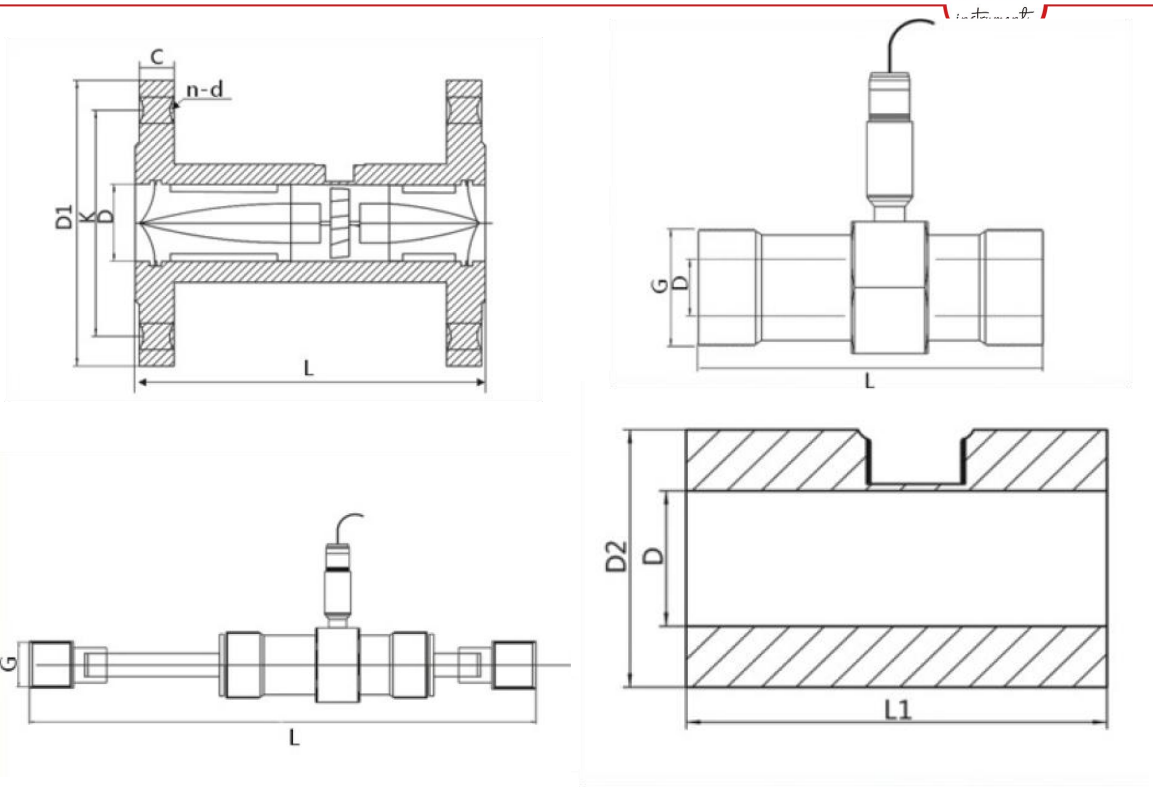
d.Double power-pulse/current output:

Use pulse coding for upward adjustment, and use current coding for downward adjustment.



VII. Installation

7.1 Installation mode

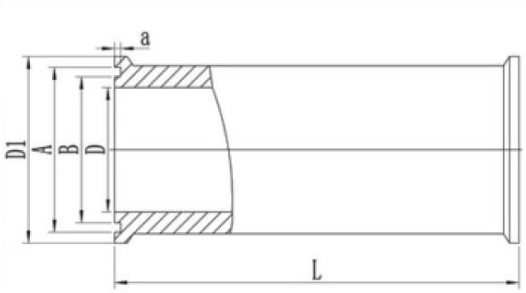


7.2 Overall dimensions

Table 9

Nominal Diameter DN (mm)	1. 6MPa Flange Outer Diameter D1	Flange Connection				Body Length L	Threaded Connection British Standard G	Wafer Connection	
		Center Distance K	Bore Diameter d	Number of Holes n	Wall Thickness C			Outer Diameter D2	Length L1
4						225	G1/2		
6						225	G1/2		
8						345	G1/2		
10						345	G1/2		
15	95	65	14	4	14	75	G1	36	75
20	105	75	14	4	16	85	G1	44	85
25	115	85	14	4	16	100	G 1 1/4	52	80
32	140	100	18	4	18	120	G 1 1/2	65	90
40	150	110	18	4	18	140	G2	74	90
50	165	125	18	4	20	150	G 2 1/2	93	120
65	185	145	18	4	20	175	G3	106	100
80	200	160	18	8	20	200	G 3 1/2	128	100
100	220	180	18	8	22	220	G 4 1/2	159	100
125	250	210	18	8	22	250			
150	285	240	22	8	24	300			
200	340	295	22	12	26	360			

Table 10

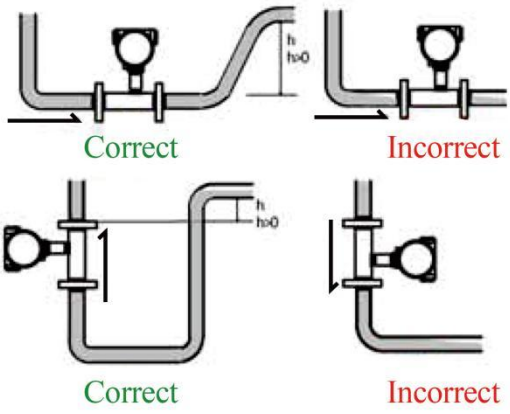


Nominal Diameter DN (mm)	Clamp connection			
	L(mm)	D1(mm)	A(mm)	B(mm)
4	50	50.5	46	40.5
6	50	50.5	46	40.5
8	50	50.5	46	40.5
10	50	50.5	46	40.5
15	75	50.5	46	40.5
20	85	50.5	46	40.5
25	100	50.5	46	40.5
32	120	50.5	46	40.5
40	140	64	59	53.5
50	150	78	73.5	68
65	175	91	86	80.5
80	200	106	110.5	94
100	220	119	113	106

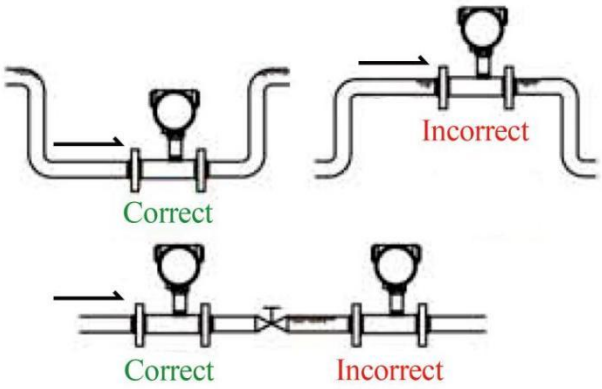
7.3 Installation Precautions

1. Installation conditions and location

(1) The pipe must be fully filled with liquid. It is important to keep the pipe completely full of liquid at any time, otherwise the flow display will be affected and it may cause measurement errors.

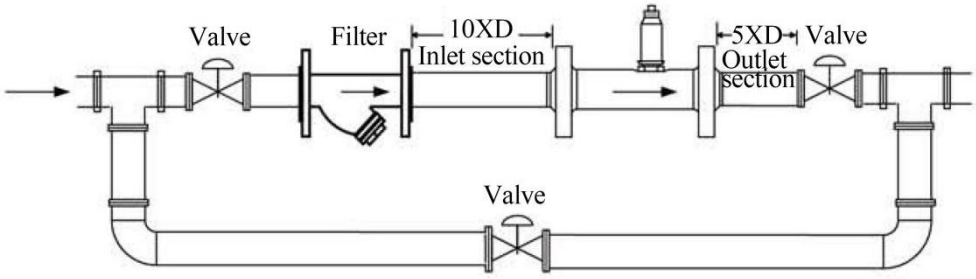


(2)Avoid air bubbles. If the air bubbles enter the measurement pipe, the flow display may be affected,which could lead to the measurement errors.



2. Installation Site and Requirements

The typical installation pipe system of the turbine flowmeter:



(1) Sensors shall be installed in a place for easy maintenance, no vibration, no strong electromagnetic interference and no thermal radiation.

(2) For horizontal installation, the pipeline should have no visually detectable inclination (generally within 5°). For vertical installation, the pipeline verticality deviation should also be less than 5°. In locations where flow cannot be stopped, a bypass pipe and reliable shut-off valve should be installed (see figure above). During measurement, ensure the bypass pipe is leak-free.

(3) At the intended sensor location on a newly laid pipeline, first connect a short section of pipe in place of the sensor. After "pipeline purging" is completed and the pipeline is confirmed to be clean, formally install the sensor.

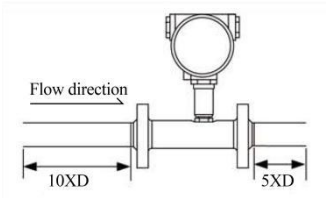
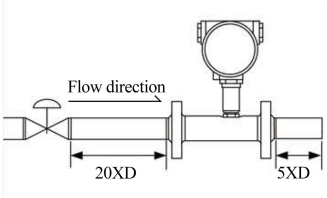
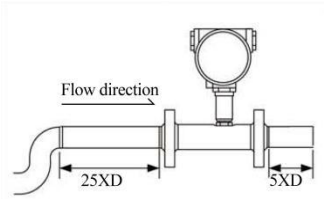
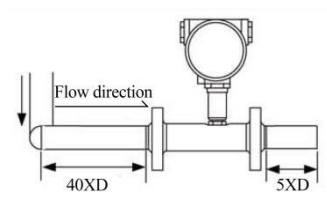
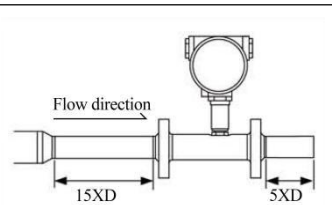
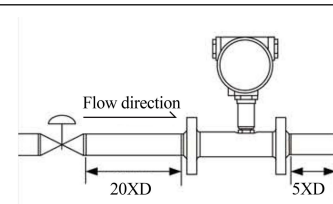
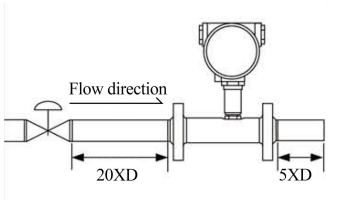
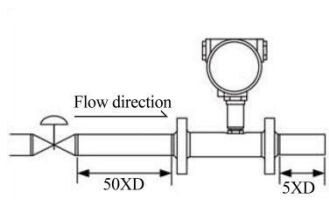
(4) If the fluid contains impurities, the filter shall be installed upstream of the sensor and Sediment and impurities in the pipeline should be cleaned and discharged regularly; if the measured liquid contains gas, install a gas eliminator on the upstream side of the sensor. The drain outlet of the filter and the vent of the gas eliminator must lead to a safe location.

(5) When the sensor is installed outdoors, measures should be taken to prevent direct sunlight and prevent rain exposure.

3. Straight pipe section length

Turbine flow meters are sensitive to flow profile distortion and swirl in the pipeline. The flow entering the sensor must be fully developed turbulent flow. Therefore, it is necessary to provide adequate straight pipe sections or flow conditioners based on the type of upstream flow disturbances. And the straight pipe section lengths for inlet and outlet sections are required.

Table 10

Type of Flow Disturbance at Inlet Section	Installation conditions		Type of Flow Disturbance at Inlet Section	Installation conditions	
	Inlet section	Outlet section		Inlet section	Outlet section
Ordinary conditions			90-degree elbows		
Two 90-degree elbows in the same plane			Two 90-degree elbows in different planes		
Reduced pipe diameter			Enlarged pipe diameter		
Full-open valve			Semi-open valve		

4. Examples for installation dimensions

The dimension shown in Table 10 is the minimum required straight pipe section installation length to ensure accuracy, and the accuracy is higher if the length of the straight pipe section is doubled.

Upstream: the allowable minimum straight pipe length is at least 10 times of the pipe

diameter.

For example,ABDT-LWGY-50, upstream straight pipe length is at least 500mm and the desired upstream straight pipe length shall be 1,000mm.

Downstream: the minimum allowable straight pipe length is at least 5 times of the pipe diameter.

For example, the ABDT-LWGY-50, downstream straight pipe length is at least 250mm. The desired length of the downstream straight pipe shall be 500mm.

VIII. Pre-Sales and After-Sales Service

1. Provide free technical consultation and assist users in model selection.

2. Guide installation and commissioning. The product provides one-year warranty period. Lifetime service is also provided beyond warranty period.

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