Vortex flow meter

Installation manual
Data Sheet

Max-flow

Varian : V-Max

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Foreword

Thank you for purchasing the vortex flow meter developed and produced by our company.
This manual documents how to use this product correctly and safely, reducing the loss of accuracy or damage to the instrument due to the installation or use environment.
The flow meter can be measured using gas, steam and liquid, but due to different ordering specifications and models, different media may damage the instrument.

After reading this manual, please flow with the instrument and keep this manual in a safe place.

Please submit this manual to the end user technical department for later use.

Please carefully review this manual before installation, and follow the contents of this manual during installation to avoid affecting accuracy or damage to the instrument.

Note：

a. **Power supply mode:** The vortex flow meter produced by our company, except for the integrated calculator or power supply, if DC power supply is required, the power supply is DC24V DC power supply, the battery power supply is DC3.6V, any does not meet the power supply conditions and is caused by power supply. The damage is not covered by the warranty. It is recommended to use brand power or system power supply. Vortex is a low-power meter, and the maximum power consumption current will not exceed 30mA.

b. **Explosion-proof statement:** The company's instrumentation line uses intrinsically safe circuits, but customers must also declare in advance when using in explosive gas environment. Explosion-proof type meters and conventional meters have certain differences, so the production process is slightly different. In addition, In an explosive atmosphere, it should also be carefully installed and used in accordance with explosion-proof requirements.

c. **Degree of protection:** The company's conventional product protection grade is IP65, which means that it does not affect the dust entry and the low pressure injection liquid at any angle. However, if the internal circuit is exposed to humid air, it will affect the meter. Therefore, in a humid environment, seal the case, wiring, etc. If there is water inside the case, immediately turn off the power and blow in a dry environment. Dry seal. In the environment where it is often raining, it must be properly protected.

d. **Use environment:** Since the vortex flow meter is very sensitive to vibration, the pipeline should be smooth and vibration-free, and there is no large-scale substation equipment around to generate high-frequency electromagnetic interference waves.
The ambient temperature should be in the range of (-25 ° C ~ 55 ° C).
The ambient humidity should be in the range of (5% to 90%).

e. **Medium condition:** The meter should meet the full tube of the medium and meet the corresponding temperature and pressure requirements. The temperature and pressure should not exceed the specified range to avoid damage to the meter. For negative pressure media, the measurement should be stated in advance. If pressure compensation is used, a negative pressure sensor should be used.

This manual is based on：

《JBT 9249-2015 Vortex flow meter》

《JJG1029-2007 Vortex flow meter verification procedure》

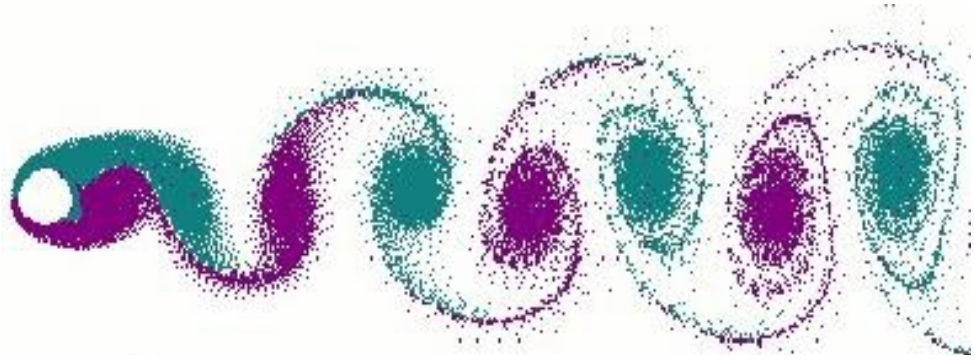
write。

Max-flow

1.Overview

The vortex flow meter produces a velocity flow meter based on the Karman vortex principle for measurement and metering of conventional gases, vapors and liquids. The vortex flow sensor has high precision and a wide range ratio. It has no moving parts in use, which can improve mechanical stability and reduce maintenance. Vortex is almost unaffected by the temperature, pressure and composition of the medium when measuring the working volume, so it is convenient for the calibration production of the instrument. Therefore, the vortex flow sensor is widely used in production and life.

When a triangular column type vortex generator is provided in the fluid, regular vortices are alternately generated from both sides of the vortex generator. These vortices are called Karman vortices, and the vortex rows are arranged asymmetrically downstream of the vortex generator. Vortex is produced according to this principle. The vortex is generated by the generating body, and the high-sensitivity sensor detects the number of vortices. The number of vortices generated in a certain range is proportional to the flow rate, so the flow rate can be calculated by a precision processor.



In a vortex flowmeter, the relationship between the flow rate and the number of vortices generated can be the following formula:

$$Q \quad \frac{3600F}{K}$$

Q：The working volume flow rate of the measured medium is measured by the company in m3/h.

F：The frequency of the number of vortices generated by the body, the company in Hz.

K：Refers to the calculated or calibrated flow coefficient, which represents how many frequency signals are in each cube, which is generally derived from calibration.

Standard table method calibration coefficient K formula:

$$K = \frac{\text{Checked table traffic} Q_{Be}}{\text{Standard table flow} Qs} \quad K_{\text{coefficient}}$$

(This formula can also be used for flow correction)

2.Technical Parameters

Main technical parameter list

Nominal diameter(mm)	15、20、25，40，50，65，80，100，125，150，200，250，300，(300～1000 Plug-in)
Nominal pressure(MPa)	DN15-DN200 4.0(>4.0 Agreement supply)， DN250-DN300 1.6(>1.6 Agreement supply)
Medium temperature(℃)	Piezoelectric：-40～100，-40～250，-40～330；Capacitive： -40～400，-40～500（Agreement supply）
Body material	1Cr18Ni9Ti，(available under other materials agreement)
Allowable vibration acceleration	Piezoelectric:0.2g Capacitive:1.0～2.0g
Accuracy	±1%R，±1.5%R； Plug-in：±2.5%R，
Range	1：6～1：25
Supply voltage	sensor：DC 24V（DC）； Battery powered：3.6V battery
output signal	Square wave pulse (excluding battery-powered type): high level ⩾ supply voltage minus 1V, low level ⩽ 1V; current: 4 ~ 20mA
Pressure loss coefficient	Meet the JB/T9249 standard Cd ⩽ 2.4
Explosion-proof mark	EXiaIICT4 Ga
Intrinsic safety parameters	Ui= 28VDC, Ii=100mA, Pi=0.657W, Ci=0. μF, Li=0mH
Protection level	Ordinary IP65 diving type IP68
Environmental conditions	Temperature -20 ° C ~ 55 ° C, relative humidity 5% ~ 90%, atmospheric pressure 86 ~ 106kPa
Applicable medium	Gas, liquid, steam
Transmission distance	Three-wire pulse output type: ⩽ 300m, two-wire standard current output type (4~20mA) ⩽1500m; load resistance ⩽500 Ω ; RS485⩽ 1200m.

涡街精度等级系类：

level of accuracy		1.0	1.5	2.0	2.5
Maximum influence error	$q_t \quad q \quad q_{max}$	1.0%	1.5%	2.0%	2.5%
	$q_{min} \quad q \quad q_t$	2.0%	3.0%	4.0%	5.0%
Note: Demarcation flow refers to $0.2\,q_{max}$					

Vortex flow range:

Different gauges measure the flow range. The meter selection process must be based on the flow range. The most taboo is to select the meter according to the thickness of the pipeline. The biggest drawback of selecting a meter based on a pipe is that it is easy to cause measurement errors due to insufficient flow.

The flow range determination of the vortex flowmeter is based on the working condition flow. Therefore, the meter selects the flow into the working condition flow and then compares the flow range table. As far as possible, the common flow is in the middle range of the meter measurement.

Instrument caliber(mm)	liquid		gas	
	Measuring range(m^3/h)	Output frequency range(Hz)	Measuring range(m^3/h)	Output frequency range(Hz)
15	0.3～5	24～400	4～20	352～1761
20	0.6～10	23～382	6～30	254～1273
25	1.2～16	21～320	8～55	161～1112
32	1.8～20	18～200	10～120	97～1172
40	2～40	10～190	27～205	134～1018
50	3～60	8～150	35～380	87～952
65	4～85	6～120	60～640	71～764
80	6.5～130	4.1～82	86～1100	54～696
100	15～220	4.7～69	133～1700	42～548
125	20～350	3.2～57	150～2000	26～346
150	30～450	2.8～43	347～4000	34～392
200	45～800	2～31	560～8000	23～326
250	65～1250	1.5～25	890～11000	18.5～229
300	95～2000	1.2～24	1360～18000	16～216
(300)	100～1500	5.5～87	1560～15600	85～880
(400)	180～3000	5.6～87	2750～27000	85～880
(500)	300～4500	5.6～88	4300～43000	85～880
(600)	450～6500	5.7～89	6100～61000	85～880
(800)	750～10000	5.7～88	11000～110000	85～880
(1000)	1200～1700	5.8～88	17000～170000	85～880
>(1000)	protocol		protocol	

Vortex flow meter working condition flow range table

The working condition flow refers to the meter measuring the volume of the current medium passing through the pipeline. The medium is in the working state. For example, the gas can be compressed. When there is pressure in the pipeline, the volume after the gas is compressed is the working condition flow. The operating flow will change as the working environment changes.

Standard flow refers to the volume of the medium at standard atmospheric pressure and 0° (or 20°), when the compressed gas is released into the volume of the standard environment. The standard traffic does not change in any environment.

The measurement of the vortex flowmeter is the working volume. Only the temperature and

pressure compensation can be used to obtain the standard volume. Generally, when used for trade measurement, the gas is mainly used as the standard condition, and the steam is usually measured by mass.

3.Structural appearance

Appearance structure

Flange-mounted vortex flowmeter The left side is a vortex flowmeter without compensation type The right side is the compensation type vortex flowmeter Supporting card mounting flange, easy to install and use		
Flange-connected vortex flowmeter The left side is a vortex flowmeter without compensation The right side is the compensation type vortex flowmeter Vortex has its own flange and only needs to be connected with the mating flange on the pipe.		
Plug-in vortex flowmeter The left side is a simple plug-in vortex flowmeter. By connecting it to the base flange, the probe is inserted into the center of the pipe and the direction is adjusted. Can be used for large diameter measurements The right side is a ball valve plug-in vortex flowmeter. The matching ball valve can be easily disassembled and maintained. It is suitable for use in large caliber and medium environments that require frequent maintenance.		

Note: Refer to the appendix for specific appearance dimensions.

4. Instrument installation

If the instrument is installed outdoors, add a sunshade to avoid sun and rain.

Do not install in places subject to strong vibration.

Do not expose to an environment that contains a lot of corrosive gases.

Do not share power with equipment that pollutes power supplies such as inverters and welders, and install clean power if necessary.

A. Installation requirements for the environment:

1. Avoid strong electrical equipment and high-frequency equipment as much as possible, and avoid sharing power with these equipment.

2. Avoid high temperature, cold, corrosive or extremely humid environment. If it must be installed, instrument protection must be done.

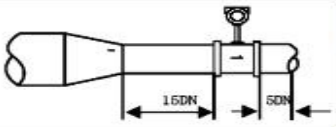
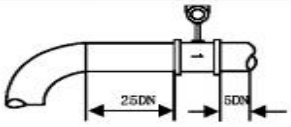
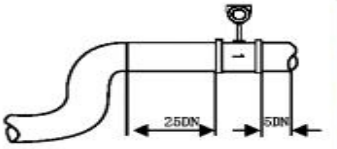
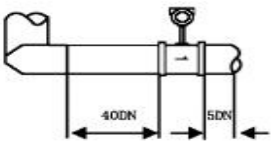
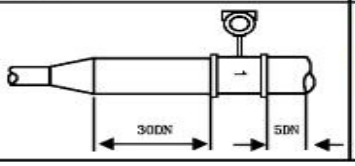
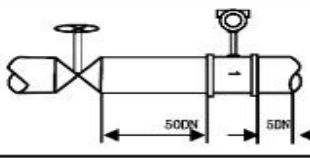
3. When installing outdoors, it should be equipped with protective cover to avoid sun and rain. When the wiring is made, the instrument line is made U-shaped. When entering the case, the line is from bottom to top to avoid the rain entering the table along the line when it rains. Inside the shell.

4. The installation position should be fully considered when installing the instrument, and leave appropriate space for maintenance and maintenance.

B. Installation requirements for the pipeline:

1. The pipe structure should be fully considered when installing the instrument. Pipe elbows or valves should be avoided.

2. When installing the vortex street, the front and rear straight pipe sections should be fully reserved to avoid the error caused by the improper installation position of the instrument. (The figure below shows the pipe length requirements when the instrument is installed)

Sensor upstream	Front and rear straight pipe length	Sensor upstream	Front and rear straight pipe length
Concentric contraction fully open valve		a 90 degree elbow	
Two 90 degree elbows in the same plane		Two 90 degree elbows in different planes	
Concentric expansion		Regulating valve half open valve	

1、1. If it is necessary to install the regulating valve, the regulating valve should not be installed upstream of the meter, but should be installed at a distance other than 10D downstream of the meter. (D is the inner diameter of the meter, the same below)

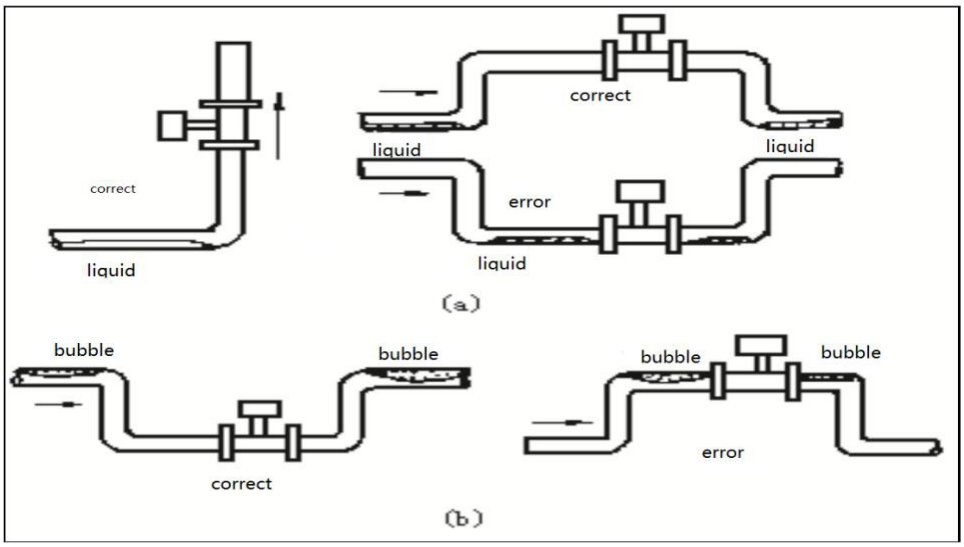
2、2. When the instrument is installed, the upstream and downstream pipelines should be consistent with the inner diameter of the instrument. The error should not exceed 0.05D, and coaxial installation should be guaranteed.

3、3. If a gasket is installed between the instrument and the flange, the gasket should not be

installed with eccentricity or too small to affect the flow condition.

4、4. When the split type is installed, the pressure measuring hole is installed in the range of 3~5D behind the meter, and the temperature measuring hole is reserved to be installed in the range of 6~8D at the back end of the meter. If it is not necessary, try to avoid installing it in front of the meter.

5、5. The instrument can be installed horizontally, vertically or obliquely on the pipe during installation. However, when measuring gas, if the pipe contains a small amount of liquid, in order to prevent the liquid from affecting the flow rate, it is recommended that the air flow flow from bottom to top. When measuring liquid, in order to ensure full meter measurement, it is generally recommended to install the pipe properly or obliquely, and the medium flows from bottom to top; if the liquid medium contains air bubbles, the meter should be installed at the lower part of the pipeline. (a is when the gas contains a liquid, and b is when the liquid contains a bubble)



C, plug-in vortex installation:

1. Use a gas weld on the pipe to open a round hole slightly smaller than Φ100mm, and clean the burrs around the round hole to ensure the fluent flow of the probe.

2. Solder the flange provided by the manufacturer at the hole in the pipe, and the flange axis is required to be perpendicular to the pipe axis.

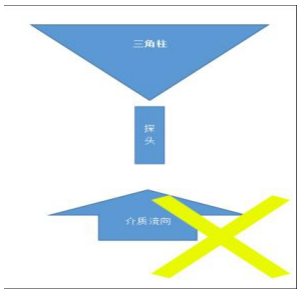
3. Install the ball valve and sensor on the welded flange.

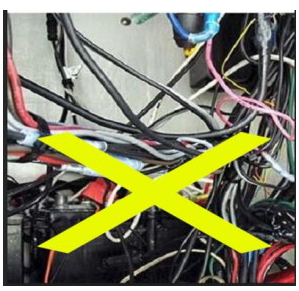
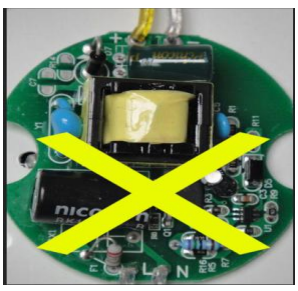
4. Adjust the lead screw so that the insertion depth meets the requirements (to ensure that the center axis of the probe coincides with the center axis of the pipe), and the fluid flow direction must be consistent with the indicator arrow on the direction mark.

5. Evenly tighten the screws on the gland. (Note: The tightness of the gland determines the degree of sealing of the instrument and whether the screw can be rotated)

6. Check that all the links are completed. Slowly open the valve to see if there is any leakage (special attention should be paid to personal safety). Repeat steps 5 and 6 if there is any leak.

D, installation taboo

Do not hold the meter when welding	Prohibit instrument reverse installation	Do not route with strong wires	Do not disassemble the internal components of the instrument without guidance

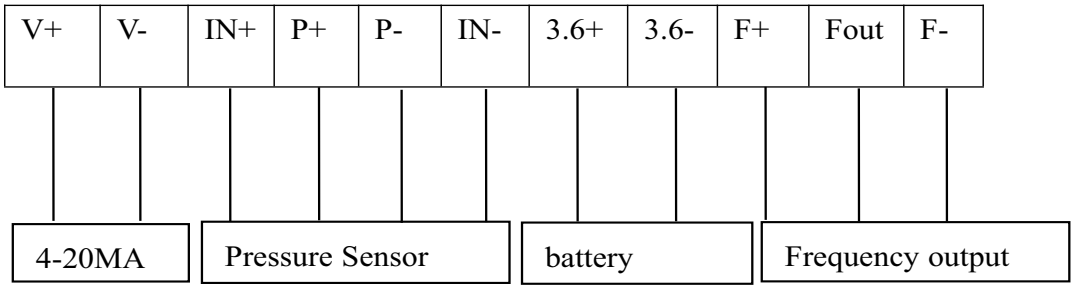
5.Cable wiring

Do not operate with electricity

Confirm the type and method of power supply

The company's products are divided into two types, according to different power supply methods, divided into battery power and 24V power supply.

wiring：



V+ V- is a two-wire current output port.

IN+ P+ P- IN- is the pressure sensor interface.

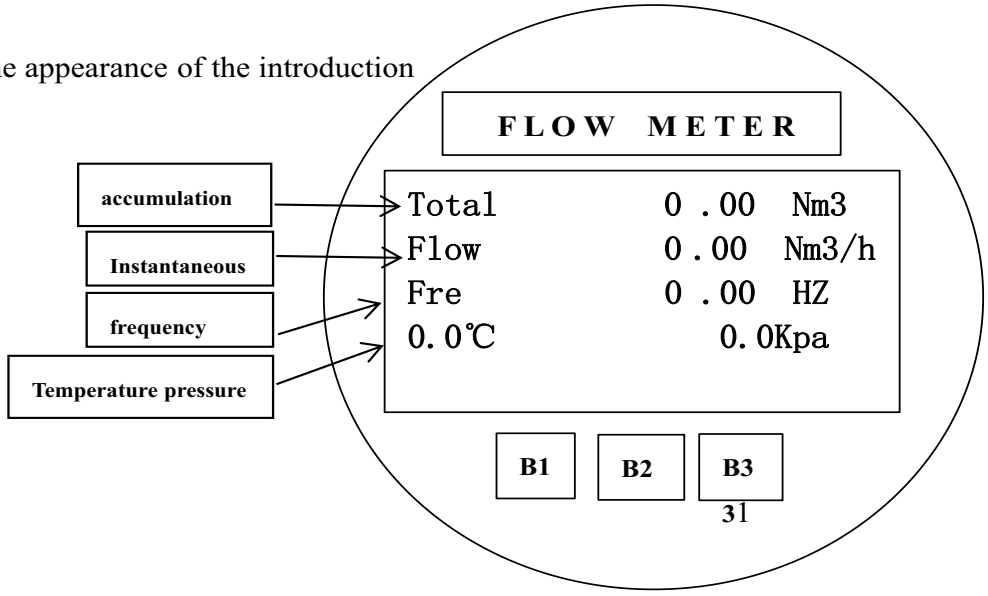
3.6+ 3.6- is the battery interface.

F+ F- is the frequency output power positive and negative interface here can be connected to 12V to 24V DC power supply, FOUT is the frequency output interface.

Which part of the function is required to connect to the corresponding terminal.

6.Debugging and running

First， the appearance of the introduction



B1 is the SHIFT button, B2 is the Δ button, and B3 is the SET button.

A. Buttons The board can be found through the appearance of three buttons. Their functions

are:

B.SHIFT: a, switch screen. You can switch to the menu screen by pressing this on the main interface.

b. Switch the menu item and press this button on the menu screen to switch between different menus.

c. Shift key, in the parameter setting, you can use this button to shift.

d. Exit, in the parameter setting, press this button to exit the menu item without the displacement item.

Δ: The digital item plus function can adjust the number of the number according to the item that can input the number. The number size can be displayed cyclically. For example, if the current display is 6, it can be displayed as 8 for 2 times, or 1 for 3 more times.

SET: a, confirm the function, mainly after modifying the parameters, press this button to confirm the parameters.

b. Switch the menu. In the parameter setting, press this key directly to switch to other parameters, and the parameter list is displayed cyclically.

B, display

1. The first row displays cumulative value: it is composed of cumulative prompt words, cumulative value and current unit, which can display 1 billion cumulative flow.

2. The second row displays instantaneous value: it consists of instantaneous prompt words, instantaneous value and current unit.

3. The third row displays the frequency value or flow rate value, which can be selected from the circuit board menu: it is composed of frequency or flow rate prompt words, frequency value or flow rate value and unit.

4. The fourth row is temperature and pressure status: the left side is composed of temperature values and temperature units, and the right side is composed of pressure values and pressure units.

Second、parameter settings

A、Display on the main page;

Total	0 .00 Nm3
Flow	0 .00 Nm3/h
Fre	0 .00 HZ
0.0℃	0.0Kpa

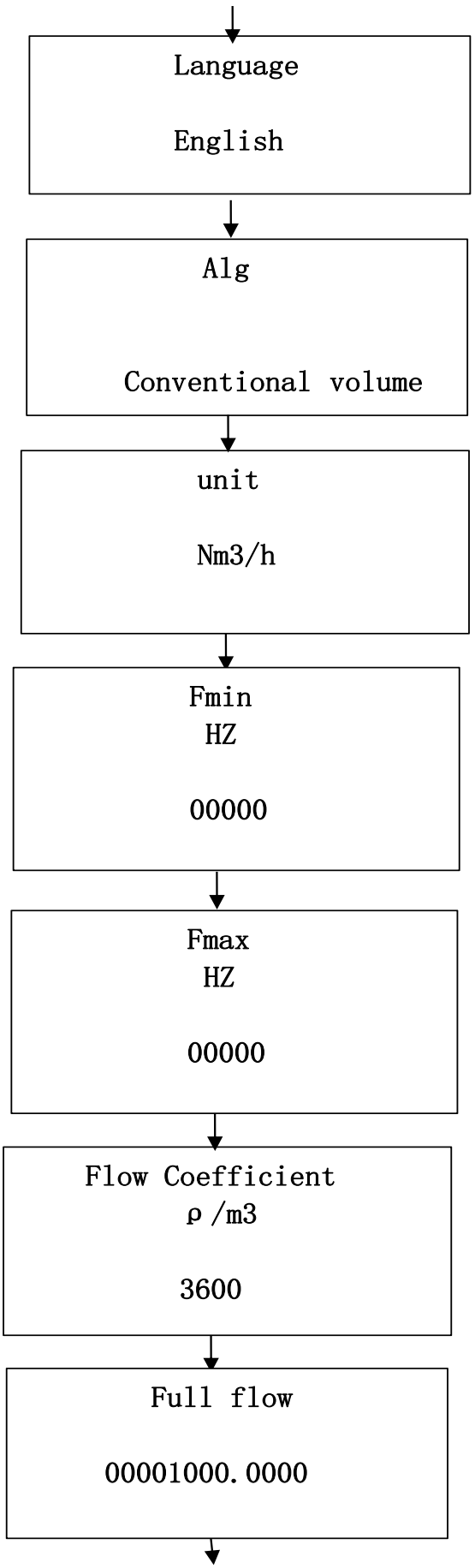
In the main interface, press the SHIFT key to enter the second main page;

B、Main page two display

Press the SHIFT (Shift Select Menu) button

Density	0 .000 Kg/m3
I	4 .000 mA
Flr	0 .000 m/s
	Password 0000

In the second interface of the main interface, press the SET key to enter submenu 1.



In the main menu of the main interface, press the SET button to enter the common menu interface. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

Under the language menu, press the SET button to save and enter the algorithm menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

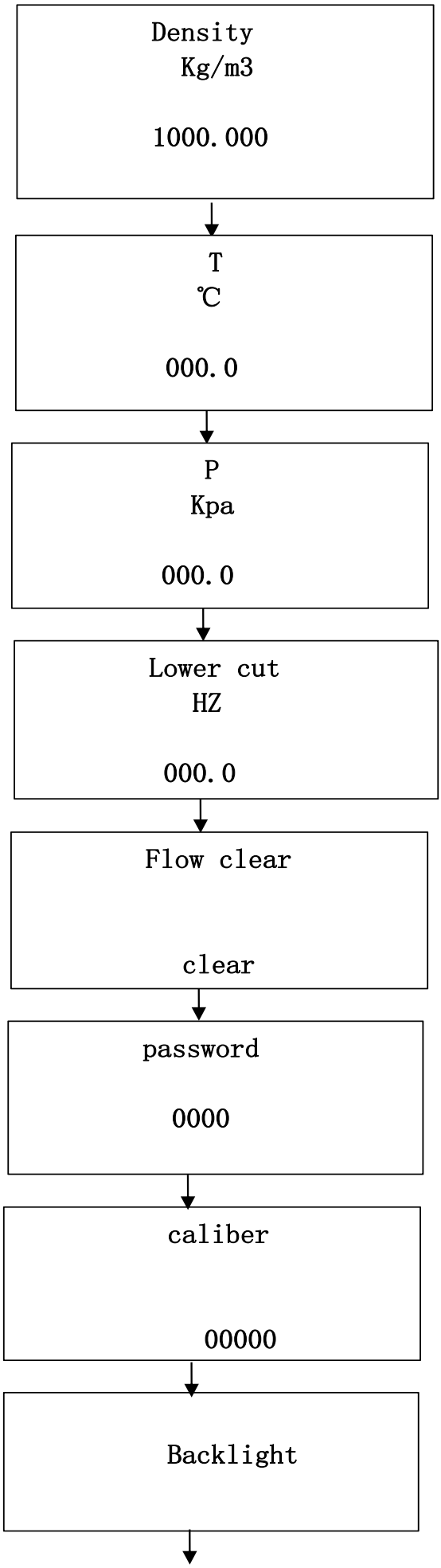
Under the Algorithm menu, press the SET button to save and enter the Units menu. Press the SET button to save and go to the next menu. Use the arrow keys to modify the unit.

Under the unit menu, press the SET button to save and enter the calibration lower limit menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

Under the calibration lower limit menu, press the SET button to save and enter the calibration upper limit menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

Under the calibration upper limit menu, press the SET button to save and enter the flow coefficient menu. Press SET to save and enter the next menu, press SHIFT to move the cursor position, arrow key to modify the parameter, the coefficient is proportional to the flow, the coefficient is the total coefficient.

In the Flow Factor menu, press the SET button to save and enter the full flow menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.



Under the Full Flow menu, press the SET button to save and enter the Density menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters. When quality is required, you can check the standard density to enter the menu.

Under the density setting menu, press the SET button to save and enter the temperature setting menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

Under the temperature setting menu, press the SET button to save and enter the pressure setting menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

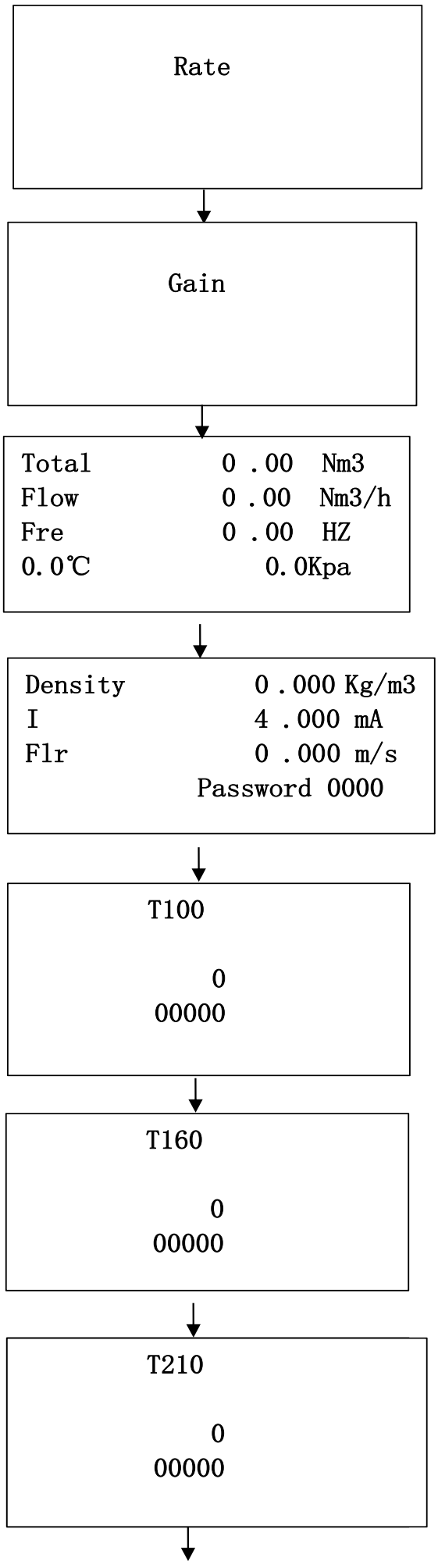
Under the gauge pressure setting menu, press the SET button to save and enter the lower cut menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

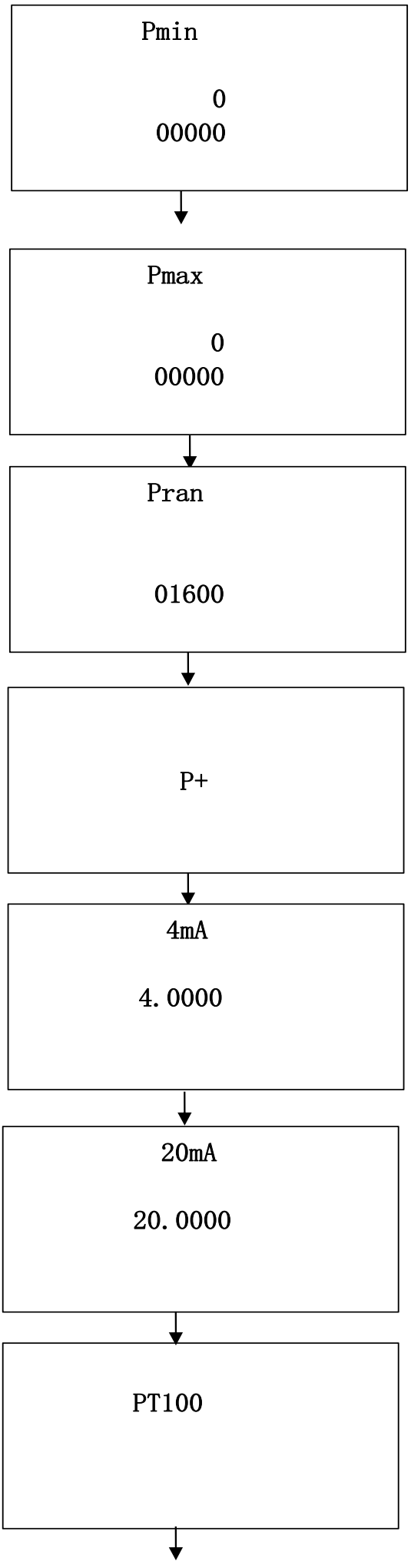
Under the lower cut menu, press the SET button to save and enter the clear menu. Press the arrow keys to clear the cumulative flow.

Under the clear menu, press the SET button to save and enter the password setting menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

In the password setting menu, press SET to save and enter the caliber menu. Press the SET key to save and enter the next menu, press the SHIFT key to move the cursor position, and key to modify the parameters

Under the zero anti-vibration menu, press the SET button to save and enter the backlight menu. Press the SET button to save and go to the next menu. Press the SHIFT button to move the cursor position and the button to modify the parameters.


Rate
Under the backlight menu, press the SET button to save and enter the speed menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
Gain
In the backlight menu, press SET to save and enter the gain menu. Press SET key to save and enter the next menu, press SHIFT key to move the cursor position, and key to modify parameters. This is the last menu, press the SET key to automatically return to the main interface,
Total 0 .00 Nm3
Flow 0 .00 Nm3/h
Fre 0 .00 HZ
0.0℃ 0.0Kpa
In the main interface one menu, press SHIFT to enter the main interface two.
Density 0 .000 Kg/m3
I 4 .000 mA
Flr 0 .000 m/s
Password 0000
In this interface, press SET to enter submenu two.
T100
0
00000
Under the password menu, press the SET button to enter the PT100 menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
T160
0
00000
Under the T100 menu, press the SET button to enter the T160 menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
T210
0
00000
Under the T160 menu, press the SET button to enter the T210 menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.



Under the T210 menu, press the SET button to enter the Pmin menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

In the Pmin menu, press the SET button to enter the Pmax menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

In the Pmax menu, press the SET button to enter the Pran menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
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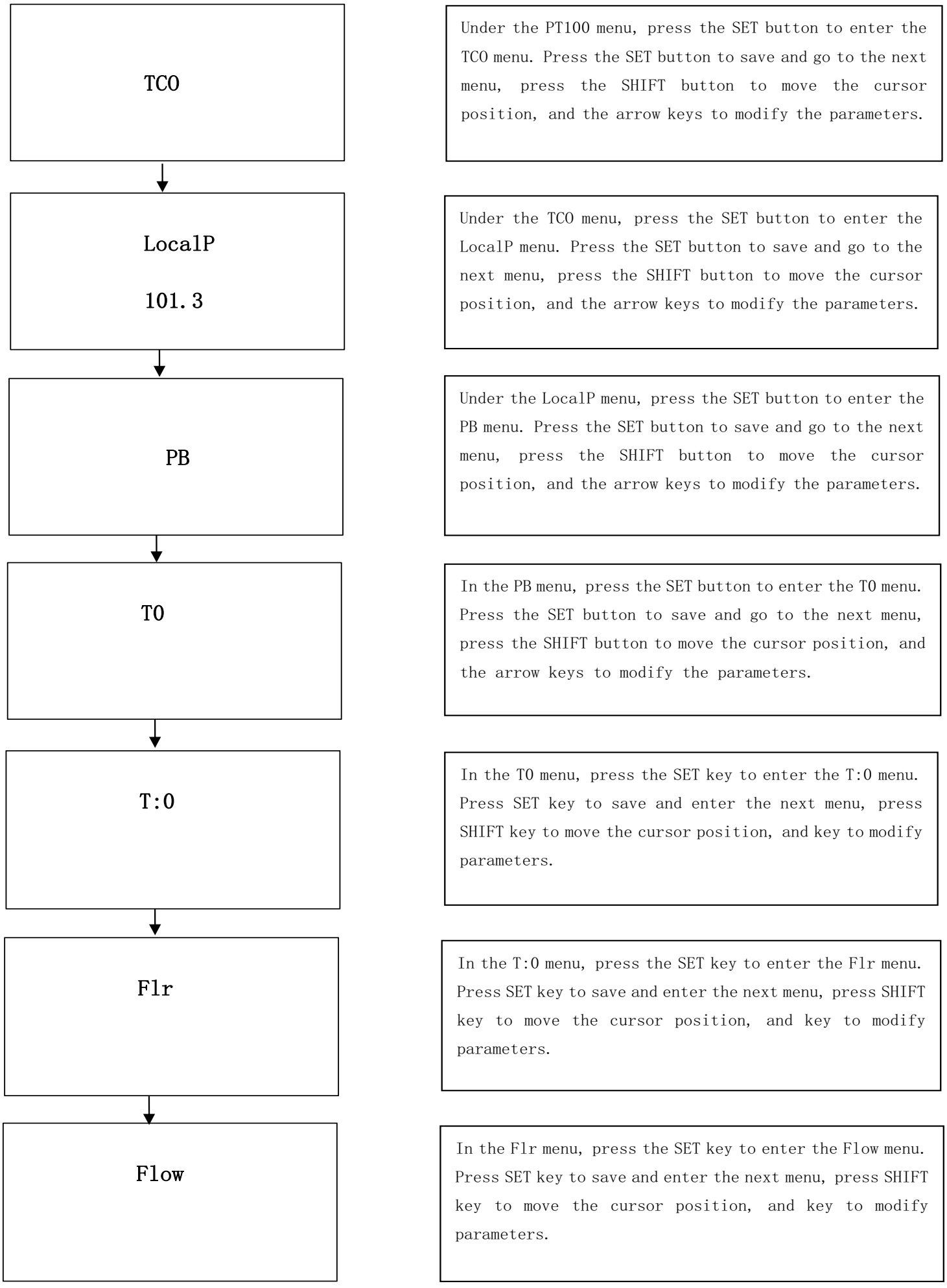
Under the Pran menu, press the SET button to enter the P+ menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

Under the P+ menu, press the SET button to enter the 4 mA menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

In the 4 mA menu, press the SET button to enter the 20 mA menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.

In the Reset menu, press the SET button to enter the PT100 menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.


TCO
Under the PT100 menu, press the SET button to enter the TCO menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
LocalP
101.3
Under the TCO menu, press the SET button to enter the LocalP menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
PB
Under the LocalP menu, press the SET button to enter the PB menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
T0
In the PB menu, press the SET button to enter the T0 menu. Press the SET button to save and go to the next menu, press the SHIFT button to move the cursor position, and the arrow keys to modify the parameters.
T:0
In the T0 menu, press the SET key to enter the T:0 menu. Press SET key to save and enter the next menu, press SHIFT key to move the cursor position, and key to modify parameters.
Flr
In the T:0 menu, press the SET key to enter the Flr menu. Press SET key to save and enter the next menu, press SHIFT key to move the cursor position, and key to modify parameters.
Flow
In the Flr menu, press the SET key to enter the Flow menu. Press SET key to save and enter the next menu, press SHIFT key to move the cursor position, and key to modify parameters.

1、Common function settings:

Menu name	Parameter value	meaning
Language	0: Chinese 1: English	Set the instrument language
algorithm	Volume (working conditions for volume) STPV (quality of work conditions) MASS(standard volume) STPm (standard quality) T comp (saturated steam) P comp(saturated steam) PT comp(superheated steam)	Different algorithms are used depending on the medium and the unit selected.
unit	m3/h； m3/m； l/h； l/m Nm3/h； Nm3/m； NL/m t/h； kg/m； kg/h	The unit of the fluid to be displayed, the unit must match the algorithm.
Fmin	0	For calibration of multi-segment coefficients, the default is 0, and the lower limit must be less than the upper limit.
Fmax	0	4 upper limit values, calibration upper limit 0 and 1 setting 2 and 3 are 0, then 3 points are calibrated, and the upper limit of calibration 0, 1, 2, 3 is set to 5 points.
Flow Coefficient	3600	The flow meter factor required to calculate the flow rate, where the four coefficients correspond to the four-stage calibration of the upper and lower calibration limits.
Full flow	1000	Set the instantaneous flow rate corresponding to the full scale at 20mA current output (not allowed to be set to 0). The unit is the same as the unit selected in Unit Selection.
Density	1000	Set the density value of the fluid in units of kg/m3 (not allowed to be set to 0) (quality algorithm needs to calculate the density value of this setting, it does not work for volume class algorithm and steam algorithm)
T	0000	It is used to set the temperature when setting. If the connected sensor automatically collects this menu and the pressure setting menu must be 0 at the same time, if one item is not 0, it will become the fixed value calculation.
P	0000	It is used to set the pressure when setting. If the sensor is automatically collected, this menu and temperature setting menu must be 0 at the

		same time. If one item is not 0, it will become the fixed value calculation. (Note here is the gauge pressure).
Lower cut	10	The setting is lower than the set frequency and the flow is not displayed (used to eliminate interference caused by environmental conditions when static).
Flow clear	clear	Clear accumulated traffic.
password	2010	Used to set the password to enter the parameter menu, the site administrator can modify the password to prevent malicious tampering with parameters.
caliber	00000	The displayed flow rate must be set to the corresponding caliber.
Backlight	0	Set to 1 backlight to turn on, set to 0 backlight to turn off
Rate	0	Set to 1-bit filtering algorithm for field flow instability
Gain	0	Mainly used for measuring gas with small diameter and measuring water with large diameter.

2, calibration parameter settings:

Note: The following menus are not allowed for private transfer by non-professionals. Private transfer may result in inaccurate temperature.

Menu name	Parameter meaning
T100	PT100 100 ohm calibration PT1000 corresponds to the variable resistance box set to 1000 ohms. Using high-precision AD conversion chip, the maximum error of about 5 ° C can be guaranteed without calibration, and the error after calibration is less than or equal to 0.5° C.
T160	The variable resistance box is calibrated to 160 ohms. The PT1000 corresponds to the 1600 ohms corresponding to the variable resistance box.
T210	Ibid. The variable resistance box hits 210 ohm calibration. The PT1000 corresponds to the variable resistance box setting corresponding to 2100 ohms.
P min	Ibid. Pressure zero check value.
P max	Pressure full scale check value.
P ran	Pressure range.
P+：0	Pressure mode, positive or negative pressure, used for negative pressure setting at constant pressure.

4mA：4.0000	Calibrate 4mA. In this menu, you must reset the parameter to 4 for calibration. The accuracy of the high-precision 16-bit DA conversion chip is less than 0.5%, which is higher than the general multimeter. The customer does not specifically require calibration.
20mA：20.000	Calibrate 20 mA. This menu must be reset to a parameter of 20 for calibration. Ibid.
PT100/PT1000	The temperature sensor is PT100 or 1000.
Tco	Temperature linear correction, the default is 50. For example, if the main interface is 100 ° C, the standard is 101 ° C, here is set to 51, if the standard is 99 ° C, set here to 49.
LocalP	Local atmospheric pressure setting.
PB/PJ	PB is a gauge pressure sensor, PJ is an absolute pressure sensor
T0/T20	T0 is the standard gas volume of 0 ° C an atmospheric pressure, T20 is 20 ° C, used for the calculation of the standard gas volume flow. Generally, natural gas is 20 ° C standard, others are 0 ° C.
T:0	0 means no compensation. 1 means to compensate the temperature error of the temperature sensor without inserting the medium. This compensation is a non-linear correction, which can ensure the compensation of the large temperature error caused by the high temperature of the uninserted medium. The notification ensures that the customer displays normal under the ambient temperature.
Fre	The default is that the display frequency is in the main interface 1, after pressing the middle button to change to Flr, the flow rate can be displayed to the main interface 1.
Flow	Select the current output channel, the default is instantaneous flow, press the middle button to change to Flr, the current output channel becomes flow rate.

Third, the dial switch settings

The vortex flowmeter adjusts the performance of the instrument with different calibers by adjusting the dial switch. In the vortex flowmeter, there are 5 sets of dial switches, which are located on the main board below the display screen, and are marked with GB (4 groups) and SB (4 groups), K1, K2, K3 printed lettering

GB and SB are four groups of dialing codes, the function of which is signal gain, which can be simply understood as sensitivity. The normal factory GB is 1, 2 is on, SB is 3 is on, the meaning is

Dial code	1	2	3	4
value	1	2	4	8

In normal use, the sum of the values corresponding to the dialing bits is used, and the larger the value, the higher the sensitivity.The functions of .K1, K2 and K3 are signal filtering, and each of their meanings is different. Here, the common caliber and medium corresponding setting values are provided. Of course, due to the difference in the meter

itself, it may be slightly different from the table below.

liquid			
caliber	K1	K2	K3
15	1357	5	123
20	1357	5	123
25	1357	5	4
32	1357	5	4
40	1458	7	1234
50	1458	7	5
80	1458	67	45
100	1458	67	6
125	1458	8	7
150	1458	8	7
200	48	8	8
250	3478	78	78
300	3478	78	78

gas			
caliber	K1	K2	K3
15	1256	1	1
20	1256	1	1
25	1256	2	2
32	1256	2	2
40	1357	2	2
50	1357	2	3
80	1357	3	13
100	1357	3	123
125	1357	4	123
150	1357	4	4
200	1458	5	4
250	1458	6	1234
300	1458	7	5

Fourth, common problems

1. The amount of field instrument frequency change is large, and the elimination method is as follows:

A. First check whether the straight pipe section meets the requirements. The gas can be relaxed to ensure the straight pipe section of the 5D after the first 10D. The liquid straight pipe section does not meet the requirements, and the straight pipe section is not long enough. It is

recommended to change the installation position. B. There may be electromagnetic interference at the scene. Method: Enhance the filtering function, reduce the sensitivity, and realize by dialing the code switch. C. The on-site flow is too small, lower than the lower limit of the instrument. For example, the plug-in gas of 300 caliber has a lower limit of 1500m3/h, but the field indicates an instantaneous flow of about 500 m3. Because the flow rate is at the lower limit, the value does not change linearly. Change the meter factor to increase traffic (not recommended). D. A similar situation can occur when measuring the pulsating flow of a liquid.

2. There is 50HZ interference on site, generally the shielded wire is not grounded.

3. No flow signal at the scene. A. The instrument small signal cut is too large, can be modified in the parameter setting; B. The power supply is not connected, no power; C. The flow rate is very low and the signal trigger point is not reached; the D.4-20mA output table is not set before leaving the factory. Range.

4. The actual flow rate increases, the instrument display can be reduced, and the reasons for the on-site working conditions (such as pipeline technology) can be checked.

5. The actual flow rate is reduced, and the meter display is increased. Most of the pipes are vibrating or the gasket is not at the center of the pipe during installation. The instrument should be reinstalled.

6. The instrument display of the same working condition is inconsistent, and the difference is large. A. The customer's experience value is wrong, or the working condition is different, such as the problem of pipeline orientation, the problem of straight pipe section, the problem of vibration, etc.; B. The customer has modified; C. The working condition flow is too low, the lower limit is not linear; D. The temperature and pressure compensation table, the temperature pressure is faulty.

7, 4-20mA output meter, display and system display are inconsistent. A. The unit of parameter setting is inconsistent, or the range is not consistent; B.4-20mA output cable is too long (more than 1000 meters), and the loss is large.

8. The flow rate displayed by the meter differs greatly from the actual one. Most of the reason is the problem of the parameter setting unit.

9. The static flow of the instrument is mostly caused by vibration of the pipeline on the site.

Damping measures or reducing the sensitivity of the instrument can be alleviated or eliminated.