

FCT-8350 flow transmitting controller

Foreword

Thank you for using the FCT-8350 flow transmitting controller !

Carefully read the relevant parts of this manual before installation and operation to prevent wrong operation, measurement error and damage of instrument. Improper installation and unsuitable flow speed will cause big measurement error, so please read the installation passage in detail.

This instrument is precise electrochemical measurement, and its installation and operation should be performed by technicians with relevant professional knowledge.

Difficulties in the process of installation or using please timely contact the service department.

Be sure to check the complete list and your received actual products, if missing or damaged please contact the company.

Solemn commitment of the manufacturer:

1. The meter's quality guarantee is one year from the date of purchasing. During this period, if the meter has quality problems, manufacturer is responsible for maintenance work for free or changes it.

2. Manufacturer offers the maintenance service for whole life of the sold meters.

3. If the damage of the meter is caused by the following reasons, it is out of the maintenance service:

A、The meter is burned or foundered caused by improper usage and maintenance.

B、The meter is refitted or misused without permit.

C、The meter is destroyed under the condition out of company's regulation.;

D、The relevant damage caused by choosing the wrong type.

E、The cable damage and rupture caused by improper installation and usage.

F、The incorrect measurement of the sensor caused by disconnecting or connecting wires personally.

G、The inner broken wire caused by indiscreetly disassembling.



When this symbol appears in the manual, means please pay attention to something about the safe, installation, product function and using !

*Without the influence on the operation, any small change or improvement on the products by the manufacturer will not be notified separately. Please make the object as the standard.

Catalogue

1. PRODUCT GENERAL INTRODUCTION	1
1.2 APPLICATIONS	2
1.3 WORKING PRINCIPLE	2
1.4 TECHNICAL FEATURES	3
2. INSTALLATION	4
2.1 INSTALLATION STEPS	4
2.2 INSTRUMENT ELECTRICAL CONNECTION	5
2.2.1 mA transmitter connection diagram	6
2.2.2 Equivalent electrical connection diagram	7
2.2.3 Photoelectric switch action diagram	8
2.3 PROBE INSTALLATION	9
2.3.1 Saddle mounting fitting assemble	10
3. ADJUSTING	15
3.1 MEASUREMENT MODE	16
3.1.1 Normal display	16
3.1.2 View status	16
3.2 SETTING MODE	16
3.2.1 Measurement parameter	17
3.2.2 Transmission options	18
3.2.3 Clear setting	18
3.2.4 Control options	18
3.2.5 Clock adjustment	18
3.2.6 Backlight setting	18
3.2.7 Language select	19
3.2.8 Password setting	19
3.2.9 Manufacture information	19
4. APPLICATION	20
5. FAILURE JUDGMENT	21
6. COMPLETE SET OF PRODUCTS	22
APPENDIX	23
DIAMETER AND K COEFFICIENT SETTING REFERENCE TABLE	23
DIAMETER/VELOCITY/FLOW REFERENCE TABLE	24

1. Product General Introduction



FCT-8350 flow transmitter controller (F-Flow,C-Controller,T-Transmitter) is an impeller flow measuring instrument, 240x160 resolution graphic dot matrix LCD display, big screen, white/green/dual background optional backlight provides instantaneous flow, cumulative flow/transmitter/control, the major parameter are display in the same screen, very easy to use and view.

Pulse type five-blade flow sensor structure is simple, cost effective.

1.1 Main technical features

- ☆ Chinese/English dual-language menu, guided menu settings and operation;
- ☆ K coefficient and standard diameter/non-standard of a variety of settings way, flexible and convenient;
- ☆ A variety of size or material pipeline connection, Tee and saddle mounting fitting for selection;
- ☆ Different kinds of the engineer working load could be chosen, it can meet the measurement standards of different country and region;
- ☆ To start the polyline modification for the measurements to provide better precision correction;
- ☆ Compatible tangential/axial-type turbine flow transmitter with pulse output;
- ☆ Small signal cutting and small signal correction function, to meet the operation compensation under low flow rate condition;
- ☆ Semiconductor photoelectric relay (non contact), switch control/proportional pulse control;
- ☆ It can achieve the ratio of flow parameter pulse pharmacy dosing and preset flow concentration of RO water control;
- ☆ Programmable instantaneous flow lower limit alarm, the frequency pulse of instantaneous flow rate, direct sensor pulse integrating volume frequency division, integrating volume pulse and many kinds of control mode for selection, it can meet different process control requirements;
- ☆ Measurement/control/transmission each unit can complete electrical

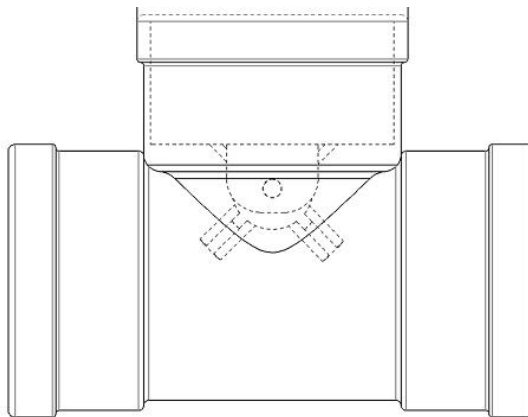
isolated, each other without any interference;

- ☆ Isolated, transferable 4~20mA current output, two points transmitting range random setting within full scope;
- ☆ present water temperature (°C) / transmitting current (4~20mA) can be check onsite;
- ☆ Industrial standard wire contact, EMC electromagnetic compatible design, platform design development, serial product classification;
- ☆ Meeting international electronic power supply regulation, AC ,DC current input which with non polarity wire connection;
- ☆ Our products with strict quality management , SMT (Surface Mounted Technology), AOI (automatic optical inspection (system), ICT ...;

1.2 Applications

Widely used for online measurement of acid& alkali in low concentrations and the low viscosity single-phase fluid of non-trade settlement process.

1.3 Working Principle



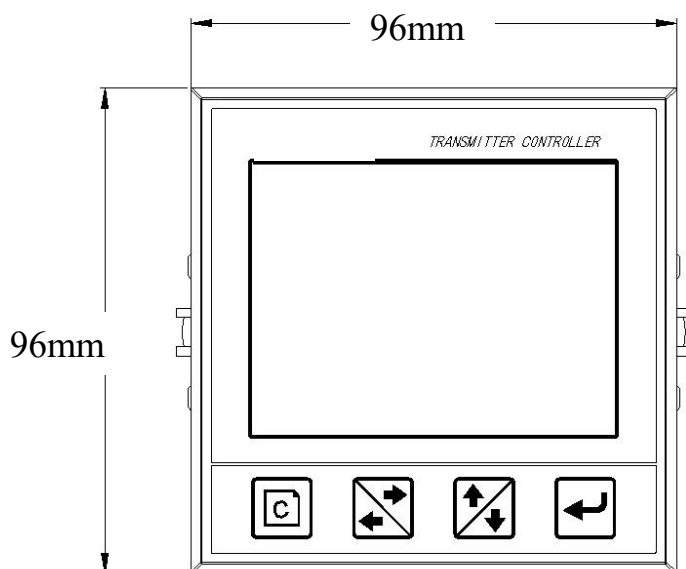
Fluid in the pipeline flow turbine cause spinning impact, Magnet on the turbine blades with the rotation sensor generates a measurement signal , the signal is proportional to the flow velocity, by a correlation coefficient K of corresponding joint size and material, use a instrument to measure and calculate the current flow.

1.4 Technical features

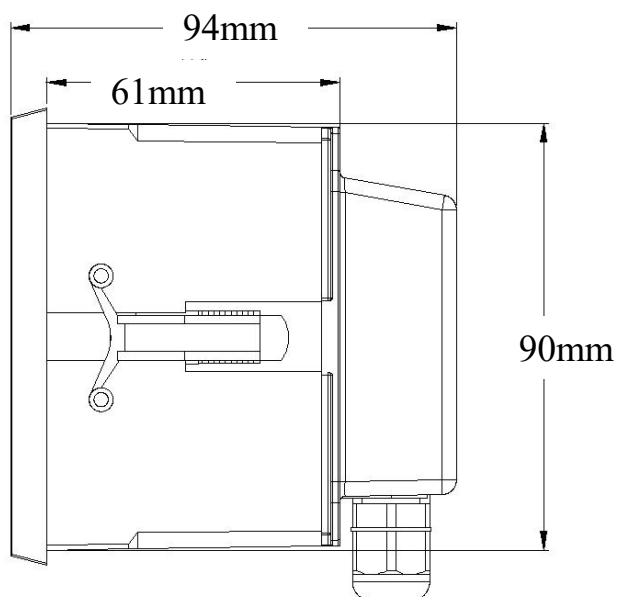
Model		FCT-8350
Measurement range	Flow rate	(0.5~5)m/s
	Instantaneous flow	(0~2000) m ³ /h
	Cumulative flow	(0~99999999) m ³
Applicable pipe diameter		DN 25~DN 1000 for selection
Resolution		0.001 m ³ /h
Renew interval		1S
Accuracy		2.0 level
Repeatability		±0.5%
Probe input		Range : 0.5Hz~2KHz(0.5~5m/s)
		Power supply: DC 12V (instrument supply)
(4~20)mA output	Channels	Single
	Characteristics	Instrument/transmitter double mode (fully isolated)
	Loop resistance	500Ω(max), DC 24V;
	Accuracy	±0.1mA
Control output	Channels	Single
	Contacts	Semi-conductor photo electronic relay
	Load capacity	Load current 50mA (max), AC/DC 30V (max)
	Control mode	Instantaneous flow high/low limit alarm, flow variable frequency conversion, probe frequency division, integrating value frequency division, OFF function
Working power		Working voltage: DC24V ±4 V power consumption: <3.0W
Cable length		5m as standard ; or (1~500) m for selection
Working environment		Temp.:(0~50)℃; relative humidity: ≤85%RH
Storage environment		Temp. : (-20~60) ℃; relative humidity : ≤85%RH (non condensation)
Protection level		IP65 (with back cover)
Dimension		96 mm×96 mm×94mm (H×W×D)
Hole size		91mm×91mm (H×W)
Installation		Panel mounted, fast installation
Probe	Material	Engineering plastic+ glass fiber
	Flow range	(0.5~5)m/s
	Pressure	≤0.6MPa
	Power supply	DC 12V
	Output pulse	Vp≥8V
	Installation	Insert pipe directly
	Diameter	DN 25~DN 350, or specified for larger pipe diameter
	Medium properties	Single medium (0~60) ℃

2. Installation

2.1 Installation steps



Instrument front view



Instrument side view

Quick installation of the structural design of the 8350 series instrument can be easily installed to the integration panel. Please follow these steps:

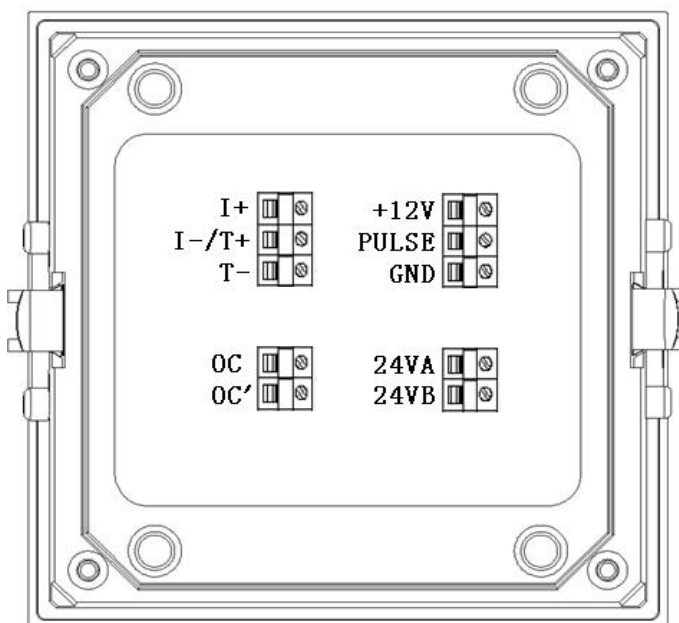
1. Insert the instrument into the 91mm×91mm (H×W) hole.

2. Push the two retaining clips onto the back of instrument along the slot, until the clip fixed in the instrument.
3. When demolish the instrument, fix the instrument by adhesive tape momentarily, or hold the rear, do not release the instrument. Stretched out the clip to the outside, and then remove the instrument.



UV long-term exposure will burn the LCD screen, leading to the LCD grayscale attenuation, try to avoid place in direct sunlight place.

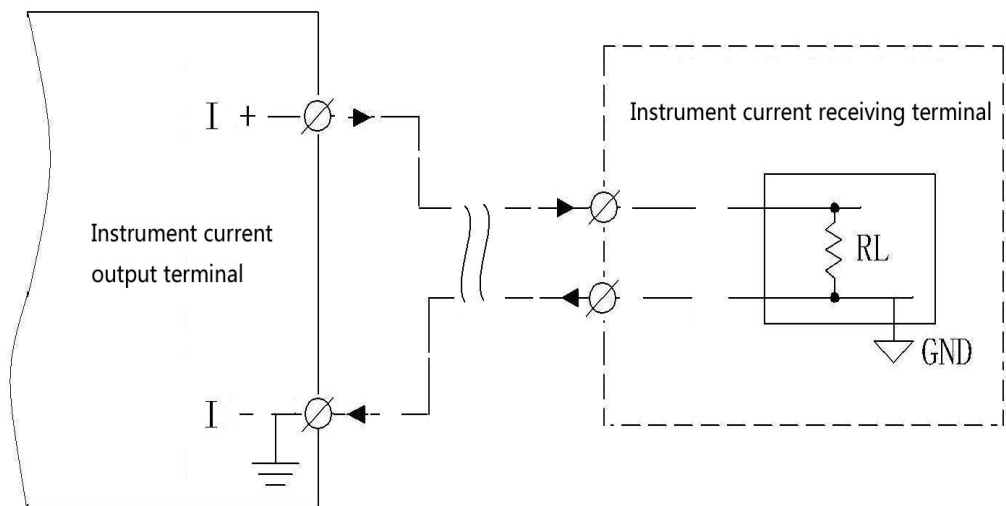
2.2 Instrument electrical connection



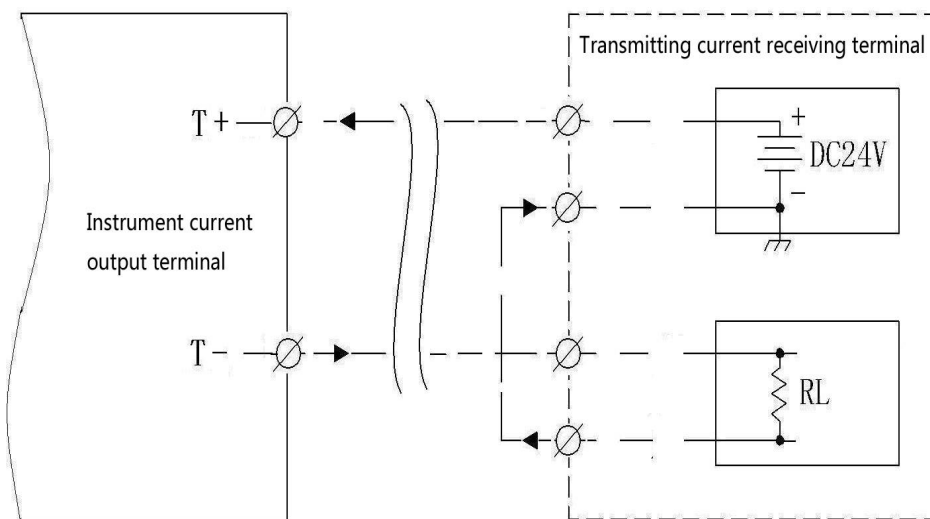
Terminal wiring instructions:

+12V	Sensor power, red line
PULSE	Sensor pulse, yellow line
GND	Sensor ground, white line
I+/I-	Under instrument mode (4~20) mA transmitting (power supplied by meter)
T+/T-	Under transmitter mode (4~20) mA transmitting (power supplied by conditioning module)
OC/OC'	Photo electronic switch control wiring point
24VA/24VB	Power input connection, connect DC 12V (Regardless of polarity connection)

2.2.1 mA transmitter connection diagram

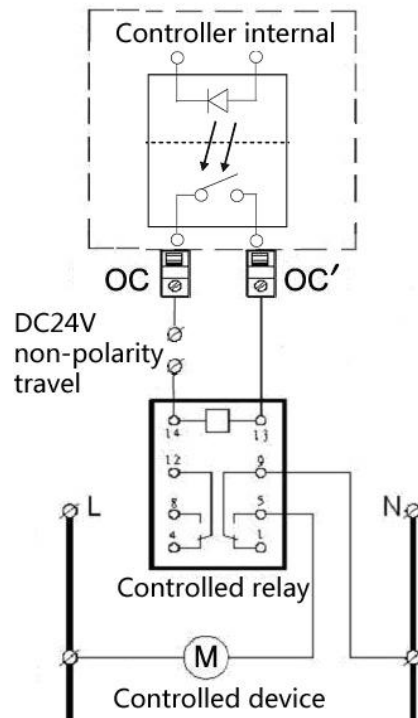


Instrument mode connection

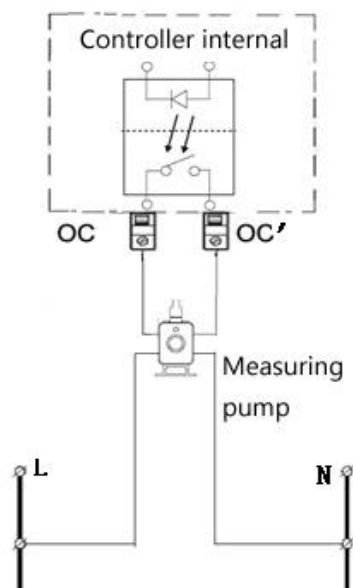


Transmitter mode connection

2.2.2 Equivalent electrical connection diagram

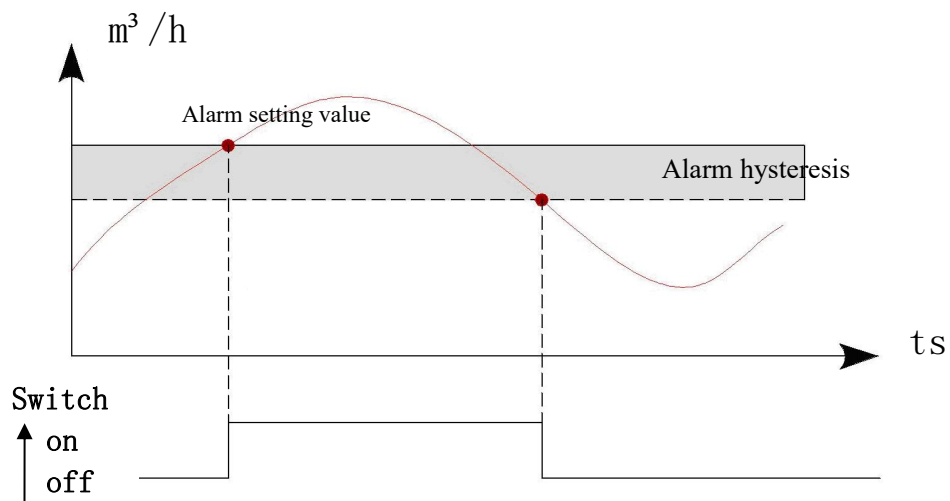


Intermediate relay expansion drive high voltage or power load

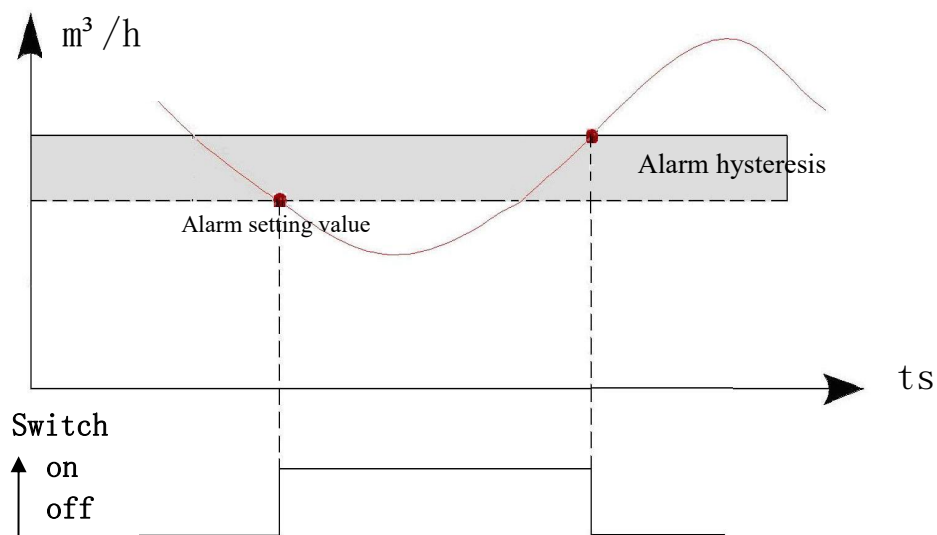


With a photo electronic switch control measuring pump

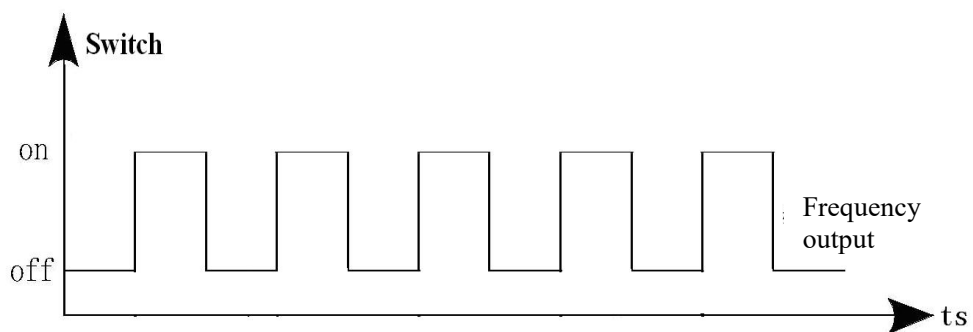
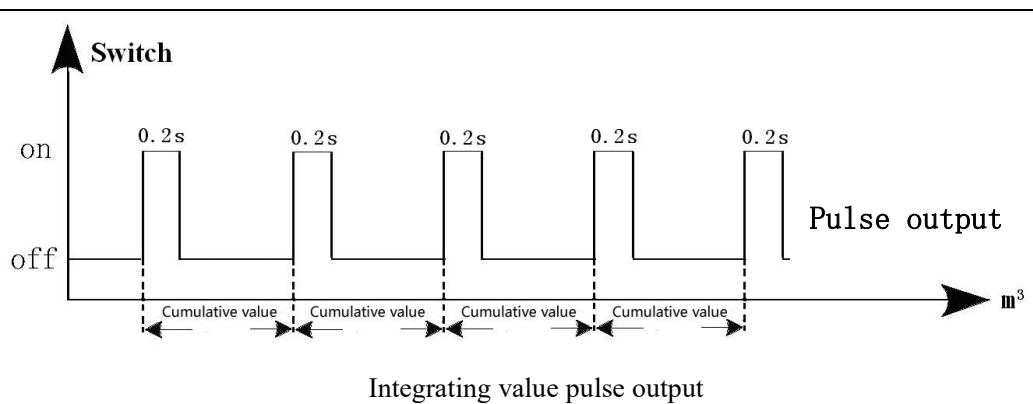
2.2.3 Photoelectric switch action diagram



Instantaneous flow high limit alarm graphic

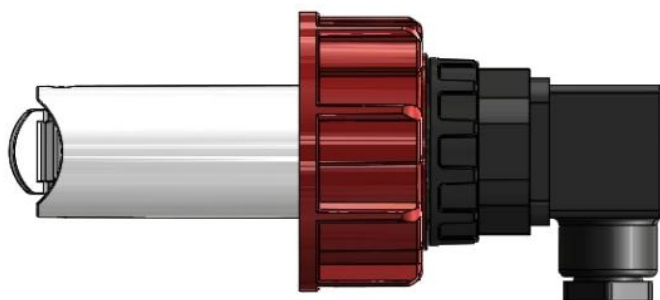


Instantaneous flow low limit alarm graphic



Instantaneous flow frequency/probe frequency division output diagram

2.3 Probe installation



Probe



Stainless steel

PVC material with Tee saddle mounting fitting

PVC material mounting

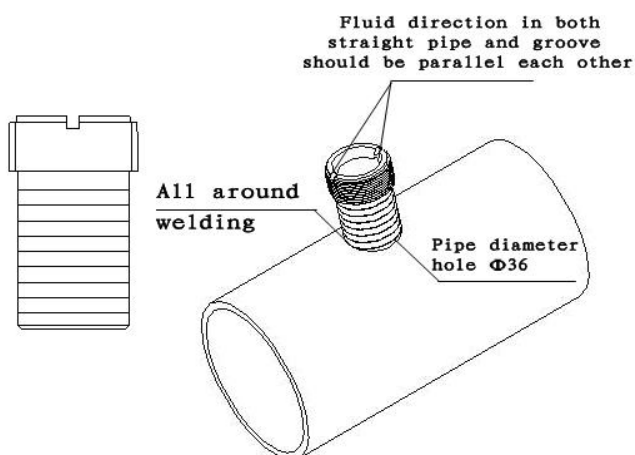


Forepart of the sensor should be soaking before install the transmitter into panel mounting, which use water lubricity to install in position and avoid the damage for O sealing ring due to dry friction. Pay more attention that two lugs of sensor must aim at two flute of panel mounting.

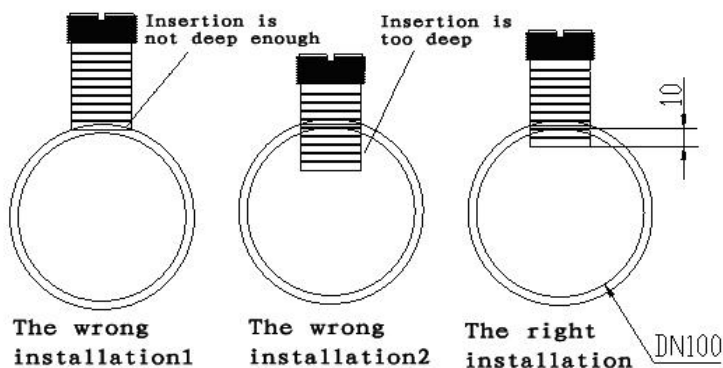
2.3.1 Saddle mounting fitting assemble

2.3.1.1 Large diameter stainless steel pipeline installation:

1. Suitable material: 316L/304 stainless steel; Diameter range: DN (50~300);
2. Hole diameter of mid pipeline: $\Phi 36\text{mm}$ (no burr and obstacles);
3. Insertion depth of saddle mounting fitting should be 1/10 depth of pipeline I.D.
4. About the scale: the paste degree scale on the mounting surface should be corresponding to the pipe inner diameter degree scale, the welding position will be located by adding the thickness of pipeline to the scale.
5. Mounting shape and requirements of installation (diagram):



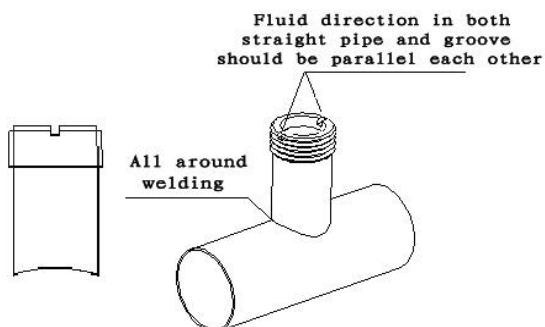
6. Installation problems (diameter DN 100, for example) :



 [Note]: When the flow meter sensor is mounted on the pipe DN100, the insertion depth of pipeline should be 1/10 of the pipeline I.D+11mm.

2.3.1.2 Small diameter stainless steel installation:

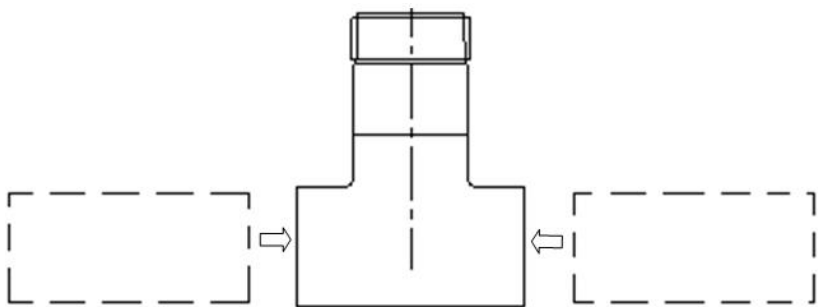
1. Applicable diameter: DN25~DN 40; material: 316L/304;
2. Hole diameter of mid pipeline: $\Phi 28\text{mm}$;
3. Hole size requirement: No burr or obstacles in the internal hole;
4. No slag or sleek shape on welding;
5. Effect drawing:



 [Note]: The curved surface of the mounting lower end should be compatible with the curved surface, no burrs in the whole welding inner.

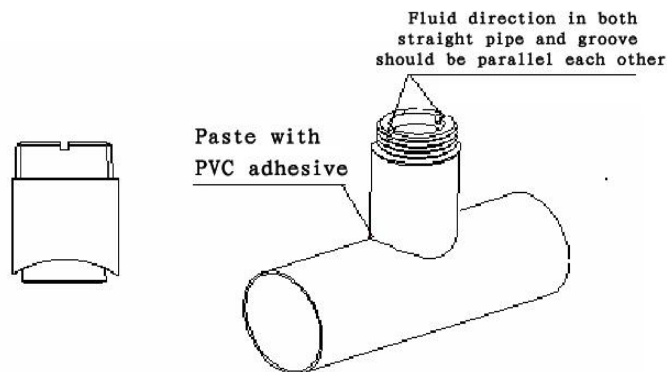
2.3.1.3 Small diameter PVC pipeline installation:

1. Applicable diameter: DN25~DN 40; material: PVC/UPVC;
2. Tee installation, Tee+ saddle fitting;
3. Effect drawing:



2.3.1.4 Large diameter PVC pipeline installation:

1. Applicable diameter: DN50~DN 300; Material: PVC/UPVC;
2. Hole diameter of mid pipeline: $\Phi 36\text{mm}$;
3. Apply glue to the mounting hole and surface, insert saddle into the pipeline, arc-shaped part should be pasted completely.
4. Effect drawing:



Attach: Our company supply $\Phi 36\text{mm}$ PVC pipeline hole tapper. Clients could add a hole tapper when placing an order. Whole tapper could be used for a long time.

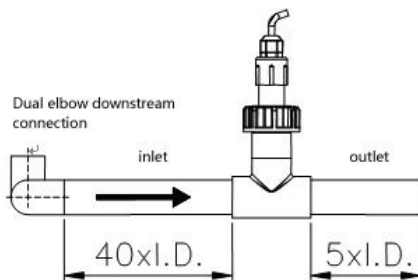
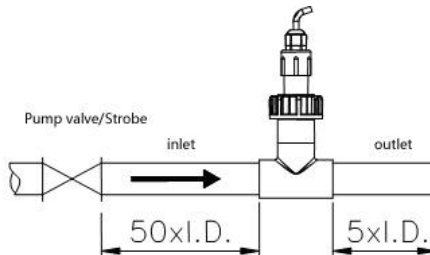
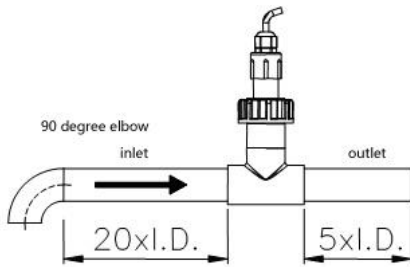
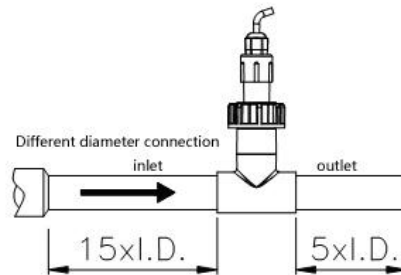
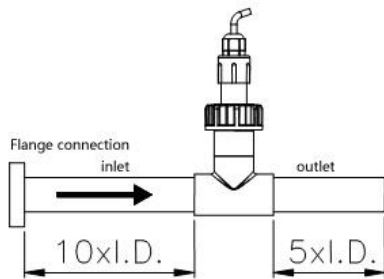
2.3.1.5 Welding and bonding of saddle mounting fitting

1)、Ensure that the gap in the direction of the transmitter mounting should be parallel with the pipeline toward, ensure that the sensor direction location key should be fit with the mounting positioning slots, turbine blade after locking the vertical shear in the flow of feelings of all fluid power.

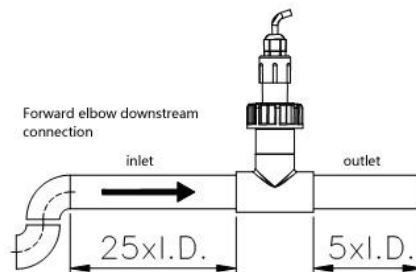
2)、Make sure that the sensor installation mounting and pipeline are in a vertical line before bonding, welding ,fastening, ensure the depth of the insertion pipe , and avoid the glue or welding slag left in the inner of installation mounting, prevent scratching the turbine.

2.3.2 Installation requirement

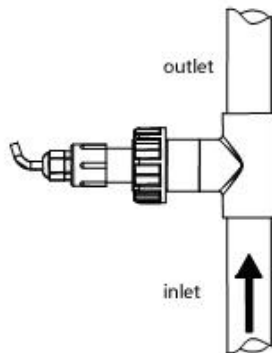
Turbine type sensor transmitters measuring system can meet all non trade settlement fluid measurement accuracy, measurement accuracy depends on the correctness of the fittings in the pipeline installation, it must comply with the legend in the straight pipe requirements, installation requirements as follows: (D said the pipe normal diameter)



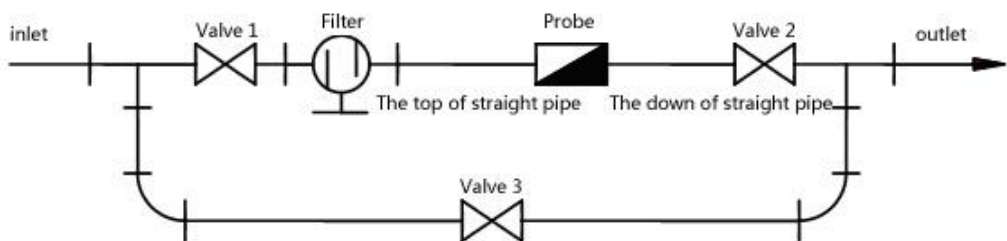
Dual elbow downstream connection



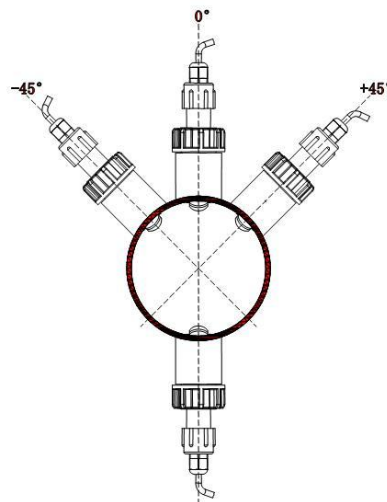
forward elbow downstream connection



Vertical pipe connection (fluid from the bottom to upward)



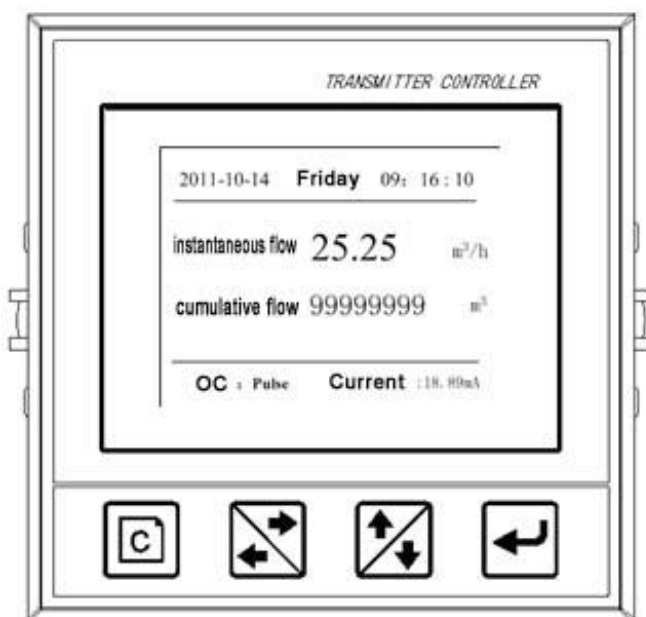
Installation when some impurities in the pipeline (add filter device in the upstream)



The connection of level of the pipeline when there are bubbles

3. Adjusting

After power on, the meter is in the measurement state, then you can enter into the view menu to view the alarm parameter and flow parameter. To enable the instrument applies to the actual application, you must enter into the setting mode to check these data parameters when you first use the instrument, these parameters are compiled in a different menu.



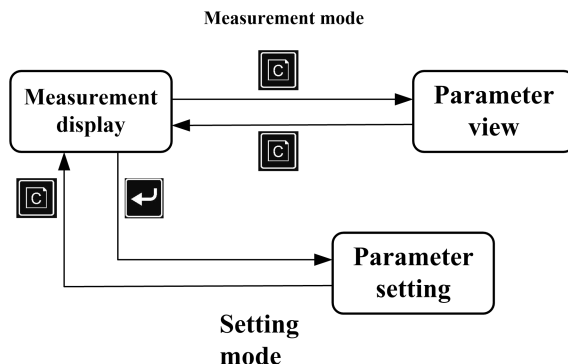
The top line of screen is the current date and time, the intermediate position shows the current measured instantaneous flow value and cumulative flow value, the bottom row shows the current mA value and control mode, in the bottom of the front panel instrument is a row of buttons, use the button on the instrument can do all the operation. Four buttons in different mode will have different functions, the details is as following:

Key	Name	Function
	Return key	1. A parameter setting state exit setting to return to the main interface 2. Measurement state to switch to display the enquiry interface
	Select key	parameter setting to select thousand, hundred, ten and unit in circulate;
	Add key	Adjust the value under setting status.;
	Enter key	1.Enter parameter setting under main menu 2.Save the parameters and enter next menu

FCT8350 the flow meter can be divided into two modes according to the running state:

- ◆ measurement mode: normal display、view status
- ◆ setting mode: Menu parameter setting

Can switch by the following diagram:



3.1 Measurement mode

3.1.1 Normal display

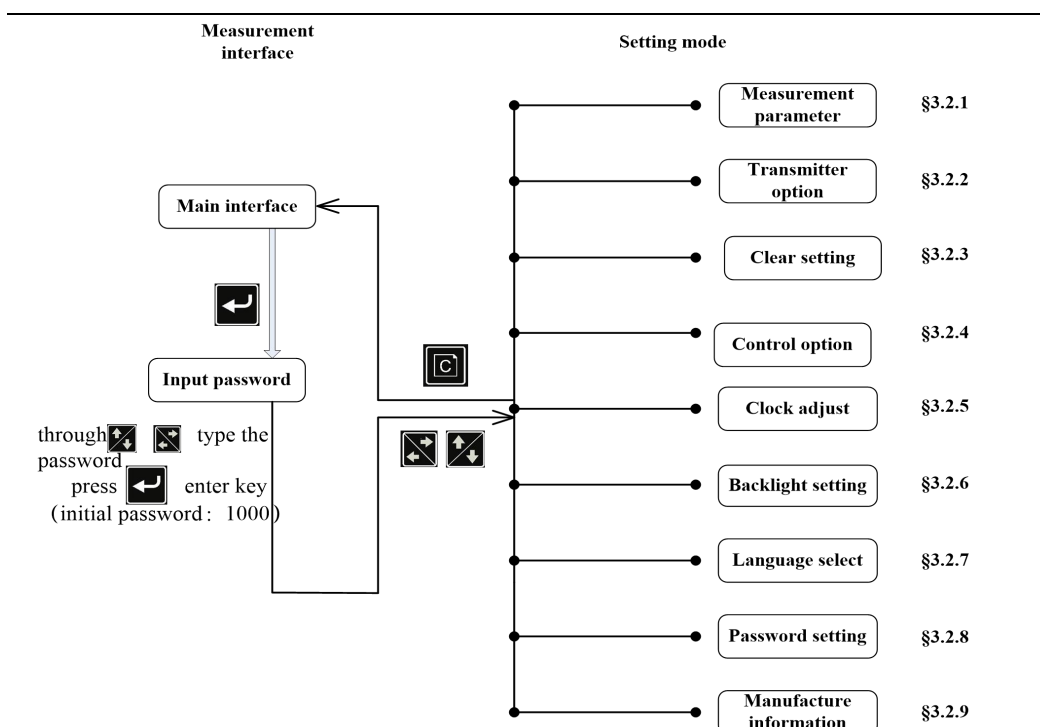
Show the measured instantaneous flow/accumulate value.

3.1.2 View status

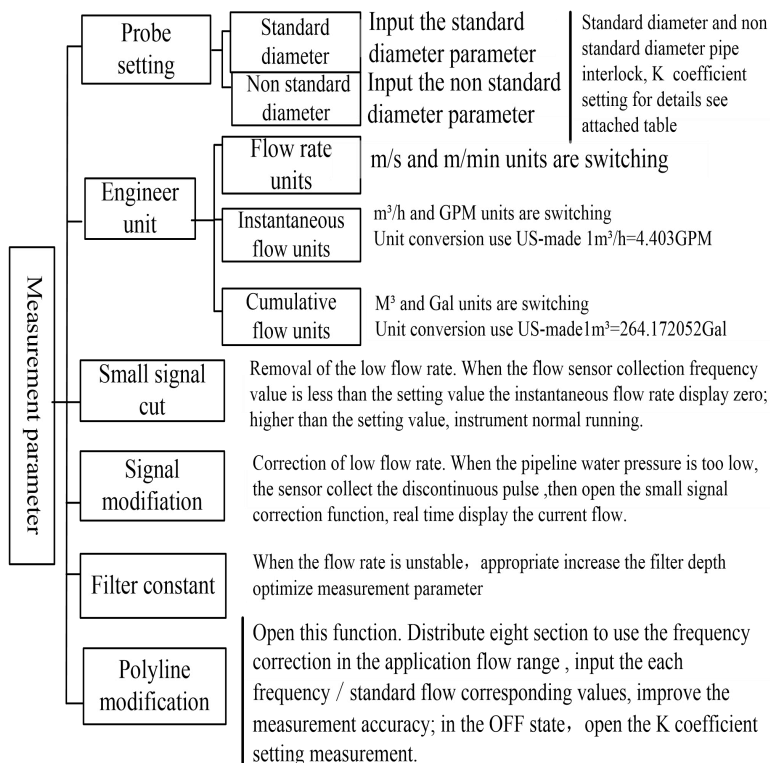
Use the  key to view the measurement parameter and control parameter.

3.2 Setting mode

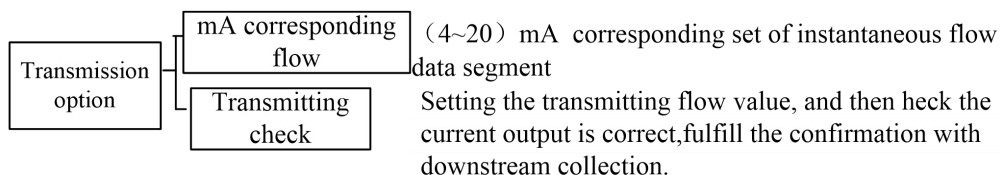
The instrument has corresponding parameter setting according to your demands before leave the factory, if the test environment changes (for example: measured values amended, modified the measuring diameter etc.), in order to make the meter meets in practical application, you must check the data parameter, these parameters distributed in different menu, specific meanings and operation methods are as follows:



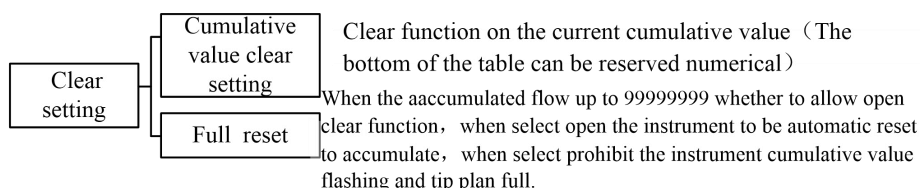
3.2.1 Measurement parameter



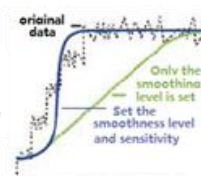
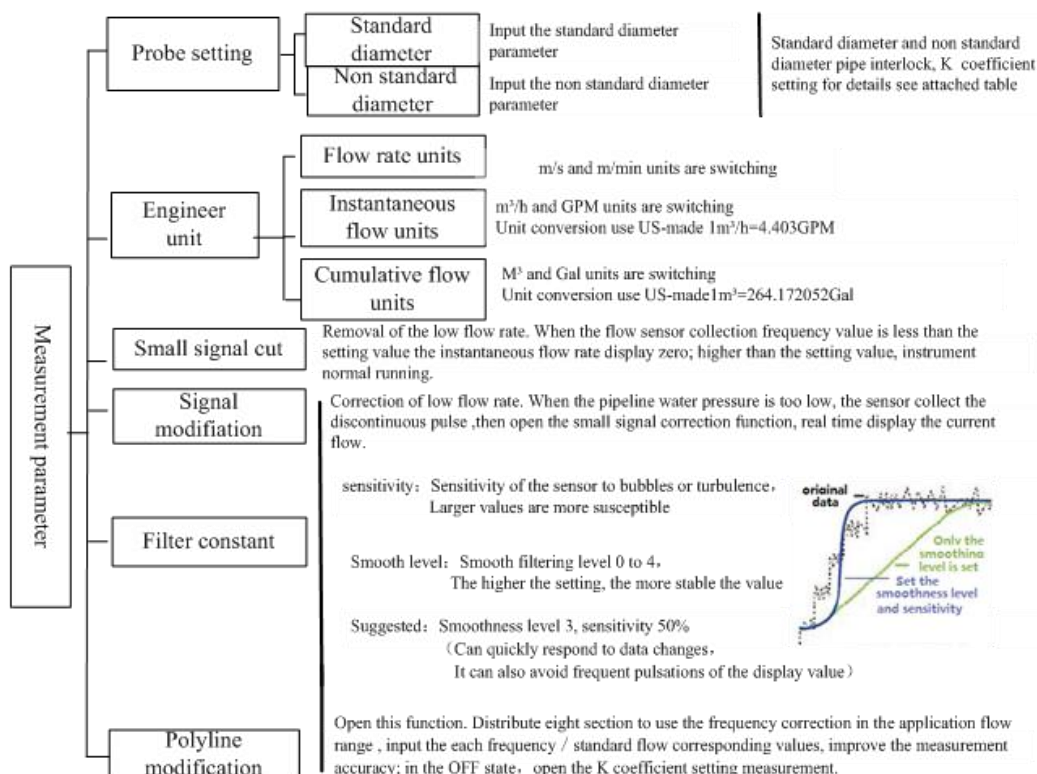
3.2.2 Transmission options



3.2.3 Clear setting



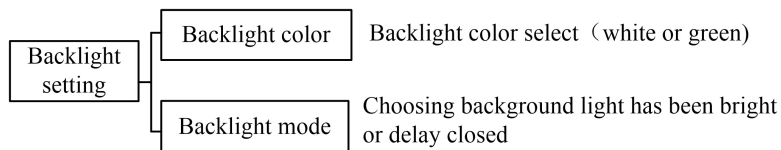
3.2.4 Control options



3.2.5 Clock adjustment

Reset the data and time。

3.2.6 Backlight setting



3.2.7 Language select

Select Chinese or English display interface

3.2.8 Password setting

Engineer user permissions can be conducted under the password changing , universal password is 1999.

3.2.9 Manufacture information

Manufacturer information, provide the consulting or after-sales convenient service.

4. Application

- A. Integrating control is accumulating for manufactured and prepared liquid. The pump will stop supply when the accumulation reach the setting value and make periodically recycle at the same accumulation. In the UF system, the back flushing control will proceed according to accumulation. The procedure from setting value of accumulation switches to back flushing process according to water quality and workmanship is called one period.
- B. Flow up and low limiting control supervises the strong water in the RO system. Set the flow value as the optimal discharge capacity to prevent operators seeking high recovery rate only at the expense of RO membrane working time.
- C. Proportion frequency conversion control, when dosing to the water, proportional additive should be done according to flow data. Control pulse pump dynamic response the proportion and ensure the same concentration dosing.
- D. During adding scale inhibitors into circulating cooling water, proportion of dosing setting should accord to quantity of added fresh water. Because the original medicament would be discharged with the waste water and it' s scientific to dosing according to the hardness and quantity of fresh water.
- E. The most simple dosing calculation method of pulse metering pump, the driver pulse is output with fractional frequency according to the number of pulses rotating impeller. It' s the direct control mode, that is, calculating the pump volume and flow and then converted this relationship into pulse and impeller is enough.
- F. The most simple dosing calculation method of pulse metering pump, the drive pulse is output with fractional frequency according to the number of pulses rotated by the impeller. It's the most direct control mode, that is, calculating the volume and flow relationship of the plunger pump and then converting it into the relationship of Impeller pulse. This setting is a very direct data relationship.

5. Failure judgment

Common failures judgment

Phenomenon	Possible factors	Exclusion methods
No display when power on	A. Power supply has been wrong B. Instrument faults	A Check the meter into the line port if there is a 24V power B. Professionals maintenance
Large deviation of the instantaneous flow	A. Probe location or installation errors B. Pipeline diameter setting error C.K-coefficient setting issues	A. Check the location and installation B, Reset the pipeline diameter C. Reset the K coefficient
Instantaneous flow display 0000	A. Homemade mount is not suitable B. The impeller do not insert in the water C. Impeller do not turn stuck by D. No flow or have air in the upper E. The impeller is twined with fiber F. Small signal cut value is too large	A. Select the original equipment mounting B. 1/10 depth of pipeline I.D. C. Remove the impeller and check instrument D. Ensure that the pipeline is full of liquid E. Increase in the upper reaches of the filter device F. View or modify the small signal cut setting value
Instantaneous flow rate display unstable	A. Installation location is incorrect B. Fluid is instability in the pipeline C. Filter depth setting is too small	A. Please install the probe in accordance with the requirement B. Select tassels stable segment C. Increase the filter depth setting
Instantaneous flow rate is zero, photoelectrical	Instantaneous flow variable frequency control options in	The corresponding pulse number is set to zero

switch still have frequency pulse output	the flow of lower limit corresponding to the pulse number is set to large	
The two mA indication is inconsistency	Receive migration error Inappropriate send setting mA send does not match	A. Reset the receive migration B. Reset the corresponding relationship between the meter and mA showing value C. Cascade the meter in the loop, then check

6. Complete set of products

Flow transmitting controller 1 piece (with a couple of back cover and clip)

Impeller flow probe 1 piece (cable length 5 meter or for selection)

Saddle mounting fitting 1 set (select according to pipe diameter)

Operation manual 1 piece

Comparison table of mounting purchase model

Mounting model	Material	Suitable diameter
F12DN25	PVC+ Tee	DN25
F12DN32	PVC+ Tee	DN32
F12DN40	PVC+ Tee	DN40
F11DN50	PVC	DN50
F11DN65	PVC	DN65
F11DN80	PVC	DN80
F11DN100	PVC	DN100
F11DN125	PVC	DN125
F11DN150	PVC	DN150
F11DN200	PVC	DN200
F11DN250	PVC	DN250
F11DN300	PVC	DN300
F11DN350	PVC	DN350
F21DN25	316L	DN25
F21DN32	316L	DN32
F21DN40	316L	DN40
F21DN50	316L	DN50
	316L	DN65
	316L	DN80
	316L	DN100
	316L	DN125
	316L	DN150

	316L	DN200
	316L	DN250
	316L	DN300
	316L	DN350

Appendix

Diameter and K coefficient setting reference table

Normal diameter DN(mm)	Instantaneous flow range (m ³ /h)	K coefficient setting reference value	Normal pressure (MPa)
25	0~10.00	102431	0.2—0.6
32	0~15.00	58140	0.2—0.6
40	0~20.00	45024	0.2—0.6
50	0~40.00	25631	0.2—0.6
65	0~60.00	16567	0.2—0.6
80	0~90.00	10937	0.2—0.6
90	0~120.0	8641	0.2—0.6
100	0~150.0	7591	0.2—0.6
125	0~200.0	4480	0.2—0.6
150	0~300.0	3111	0.1—0.6
200	0~400.0	1750	0.1—0.6
250	0~500.0	1120	0.1—0.6
300	0~800	778	0.1—0.6
350	0~1000	571	0.1—0.6

For metal pipe calculated on the general engineering , pipeline common pressure is 0.1—0.6Mpa, the pipeline flow rate is in the range of 13m/s, usually is 1.5m/s. The reference value is as follow:

Diameter/velocity/flow reference table

Diameter (Dn)	0.4m/s	0.6m/s	0.8m/s	1.0m/s	1.2m/s	1.4m/s	1.6 m/s	1.8 m/s	2.0m/s	2.2m/s	2.4m/s	2.6m/s	2.8m/s	3.0m/s
The velocity corresponding flow m ³ /h														
20	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0	2.3	2.5	2.7	2.9	3.2	3.4
25	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3
32	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	6.9	7.5	8.1	8.7
40	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	10.0	10.9	11.8	12.7	13.6
50	2.8	4.2	5.7	7.1	8.5	9.9	11.3	12.7	14.1	15.6	17.0	18.4	19.8	21.2
65	4.8	7.2	9.6	11.9	14.3	16.7	19.1	21.5	23.9	26.3	28.7	31.1	33.4	35.8
80	7.2	10.9	14.5	18.1	21.7	25.3	29.0	32.6	36.2	39.8	43.4	47.0	50.7	54.3
100	11.3	17.0	22.6	28.3	33.9	39.6	45.2	50.9	56.5	62.2	67.9	73.5	79.2	84.8
125	17.7	26.5	35.3	44.2	53.0	61.9	70.7	79.5	88.4	97.2	106.0	114.9	123.7	132.5
150	25.4	38.2	50.9	63.6	76.3	89.1	101.8	114.5	127.2	140.0	152.7	165.4	178.1	190.9
200	45.2	67.9	90.5	113.1	135.7	158.3	181.0	208.6	226.2	248.8	271.4	294.1	316.7	339.3
250	70.7	106.0	141.4	176.7	212.1	247.4	282.7	318.1	353.4	388.8	424.1	459.5	494.8	530.1
300	101.8	152.7	208.6	254.5	305.4	366.3	407.1	488.0	508.9	589.8	640.7	661.6	712.5	763.4
350	138.5	207.8	277.1	346.4	415.6	484.9	554.2	623.4	692.7	762.0	831.3	900.5	969.8	1039.1
400	181.0	271.4	381.9	462.4	542.9	633.3	723.8	814.3	904.8	995.3	1085.7	1176.2	1266.7	1357.2
450	229.0	343.5	488.0	572.6	687.1	801.6	916.1	1080.6	1145.1	1259.6	1374.1	1488.6	1608.2	1717.7
500	282.7	424.1	565.5	706.9	848.2	989.6	1131.0	1272.3	1413.7	1555.1	1696.5	1837.8	1979.2	2120.6
600	401.1	610.7	814.3	1017.9	1221.4	1425.0	1628.6	1832.2	2085.7	2239.3	2442.9	2646.5	2850.0	3053.6
Velocity recommended value m/s :														
Diameter (Dn)	20	25	32	40	50	65	80	100	125	150	200	250	300	400
Closed system	0.5-0.6	0.6-0.7	0.7-0.9	0.8-1	0.9-1.2	1.1-1.4	1.2-1.6	1.3-1.8	1.5-2.0	1.6-2.2	1.8-2.5	1.8-2.6	1.9-2.9	1.8-2.6
Open system	0.4-0.5	0.5-0.6	0.6-0.8	0.7-0.9	0.8-1.0	0.9-1.2	1.1-1.4	1.2-1.6	1.4-1.8	1.5-2.0	1.6-2.3	1.7-2.4	1.7-2.4	1.8-2.3