

# FXPVF Series

## Intelligent Precession Vortex Flow Meter

### 1. Overview

Intelligent precession vortex flow meter is a new type of gas flow meter developed by our company, which has the leading level in China. The flow meter integrates the functions of flow, temperature and pressure detection, and can automatically compensate the temperature, pressure and compression factors. It is an ideal instrument for gas metering in petroleum, chemical industry, electric power, metallurgy and other industries.

#### 1.1 Main features of the product

Mechanical moving parts, not easy corrosion, stable and reliable, long life, long running without special maintenance;

Using 16-bit single chip, high integration, small size, good performance, the whole machine function is strong;

Set intelligent flow meter flow sensor, microprocessor, pressure and temperature sensor, adopt built-in combination, make the structure more compact, can directly measure the fluid flow, pressure and temperature, and automatic tracking compensation and real-time compression factor correction;

The double detection technology can effectively improve the detection signal strength, and restrain the disturbance caused by pipeline vibration;

Adopt domestic leading intelligent seismic technology, effectively suppress the vibration and pressure fluctuation caused by the interference signal;

Using Chinese characters dot matrix display screen, display digits, more intuitive reading convenient, can be directly display the working status of traffic volume, the standard conditions, the total volume flow, parameters such as pressure, temperature and medium;

Block using EEPROM technology, convenient parameter Settings, can be permanent, and can save up to a year of historical data;

Converter can output pulse frequency, 4 ~ 20 ma analog signals, with RS485 interface, can be directly with the computer networking, transmission distance of 1.2 km;

Physical parameter alarm output more, can choose any one of them by the user;

Flowmeter header can rotate 360 degrees, installation is simple to use convenient;

Cooperate with our company FM type data collector, can through the Internet or telephone network for remote data transmission

The sensor input pressure and temperature signal, strong interchangeability.

Machine low power consumption, can be used in batteries, also can be an external power supply.

## 1.2 The main purpose

Intelligent precession vortex flow meter can be widely used in petroleum, chemical industry, electric power, metallurgy, urban gas supply and other industries to measure the flow of various gases, is currently the oilfield and urban natural gas transmission and distribution measurement and trade measurement of the preferred product.

## 2. Structure and working principle

### 2.1 Flow meter structure

The flow meter consists of the following seven basic components (figure 1) :

#### 1. Vortex generator

Made of aluminum alloy, with a certain Angle the spiral blade, it is fixed in front of the shell contraction section, forcing the fluid to produce a strong vortex flow.

#### 3. The shell

With flanges and a certain shape of fluid passage, the shell material can be cast aluminum alloy or stainless steel according to different working pressure.

#### 4. Intelligent flow meter integrator

It is composed of analog channel for temperature and pressure detection, digital channel for flow detection, micro-processing unit, liquid crystal driving circuit and other auxiliary circuits, and is equipped with external signal interface.

#### 5. Temperature sensor

Pt100 platinum resistance is taken as temperature sensitive element, and its resistance value corresponds to the temperature within a certain temperature range.

#### 6. Pressure transducer

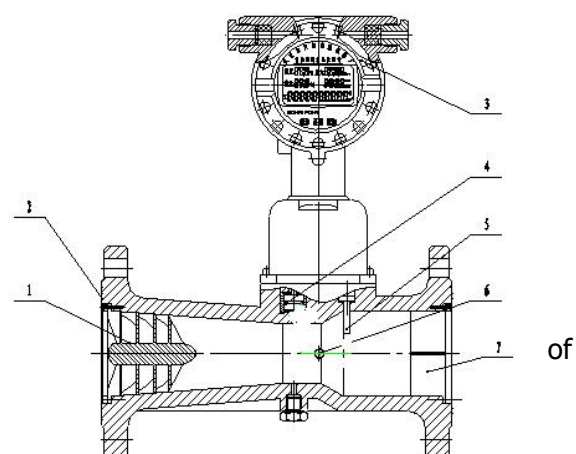
With piezoresistive diffused silicon bridge as the sensitive element, the resistance of the bridge arm will change as expected under the action of external pressure. Therefore, under the action of certain excitation current, the potential difference between the two output terminals is proportional to the external pressure.

#### 7. Piezoelectric crystal sensor

The frequency signal of vortex precession can be detected by installing it near the throat of the shell expansion section.

#### 8. Disappear is investigated

Fixed in the outlet section of the shell, its function is to eliminate vortex flow, so as to reduce the



impact on downstream instrument performance.

inside nominal diameter (mm)	type*	Flow range(m <sup>3</sup> / h)	Pressure of work (MPa)	Degree of accuracy	repetitive
15		1.0-10	1.6 2.5 4.0 6.3 10 16	1.0 1.5	Less than 1/3 of the absolute value of the fundamental error limit
20		1.5-15			
25		3.0-30			
32		6.0~60			
40		7.0~70			
50	A	12~150			
	B	2.5~75			
80	A	40~400			
	B	10~200			
100	A	80~900			
	B	30~600			
150	A	150~1500			
	B	40~900			
200		240~3600	1.6;2.5;4.0		

Note: 1. Accuracy: refers to the system accuracy after temperature and pressure correction;  
2. A and B are used to distinguish different flow ranges with the same diameter.

## 2.2 Standard state conditions

**P=101.325KPa, T=293.15K**

## 2.3 Conditions of use:

Ambient temperature: - 30 °C ~ + 65 °C

Relative humidity: 5% ~ 95%

Medium temperature: - 20 °C ~ + 80 °C

Atmospheric pressure: 86KPa ~ 106KPa

## 2.4 Electrical performance index

### 2.4.1:

A. External power supply: +24VDC + 15%, ripple < 5%, suitable for 4-20ma output, pulse output, alarm output, rs-485, etc.

B. Internal power supply: a group of 3.6v lithium batteries (ER26500), when the voltage is lower than 3.0v, the under-voltage indicator appears.

### 2.4.2 power consumption:

A. External power supply: <2W;

B. Internal power supply: the average power consumption is 1mW, which can be used continuously for more than two years.

### 2.4.3 pulse output mode:

A. Working condition pulse signal, the working condition pulse signal detected by the flow sensor is amplified and output directly through optocoupler isolation. The high level is greater than or equal to 20V, and the low level is less than or equal to 1V.

B. Calibration pulse signal, matched with IC card valve controller, high level amplitude is greater than 2.8v, low level amplitude is less than 0.2v, unit pulse represents volume volume can be set range: 0.001m<sup>3</sup>~100m<sup>3</sup>. When selecting this value alone, it must be noted that the calibration pulse pulse signal frequency should be no more than 900Hz.

C. Calibration pulse signal, amplification output by optocoupler isolation, high level is greater than or equal to 20V, low level is less than or equal to 1V.

### 2.4.4 rs-485 communication (photoelectric isolation) can achieve the following functions:

A. Rs-485 interface is adopted, which can be directly connected to the upper computer or secondary table, and can transmit the temperature and pressure of the display medium and the standard volume flow and the total standard volume after temperature and pressure compensation.

B. By the RS - 485 interface with HW - I data collector, can form the telephone network communication system, a data collector with 15 meter;

C. By the RS - 485 interface with HW - II data collector, shall constitute a broadband network communication system, by the INTERNET to transmit data, a data collector can bring 8 meter.

### 2.4.5 4-20ma standard current signal (photoelectric isolation)

It is directly proportional to the standard volume flow, 4mA corresponds to 0 m<sup>3</sup>/h, and 20 mA corresponds to the maximum standard volume flow (the value can be set in the first level menu). Type: two-wire system or three-wire system, the flow meter can be automatically identified according to the inserted current module, and the correct output.

inside nominal diameter DN(mm)	Nominal pressure (MPa)	Overall dimensions ( mm )		The table body material		weight (kg)
		The length of the table A	Height H	Stainless steel	Aluminum alloy	
20	1.6/2.5/4.0	160	360	√	√	6
	6.3/10/16	160	365	√		8
25	1.6/2.5/4.0	180	367	√	√	7
	6.3/10/16	180	378	√		10
32	1.6/2.5/4.0	200	383	√	√	9
	6.3/10/16	200	402	√		12
40	1.6/2.5/4.0	200	383	√	√	9
	6.3/10/16	200	402	√		12
50	1.6/2.5/4.0	230	403	√		11
	6.3/10/16	230	421	√		14
80	1.6	330	438	√	√	11
	2.5/4.0	330	438	√		18
	6.3/10/16	330	446	√		21
100	1.6	410	468	√	√	14
	2.5/4.0	410	475	√		18
	6.3/10/16	410	483	√		33
150	1.6	585	542	√	√	21
	2.5/4.0	585	549	√		52
	6.3/10/16	585	572	√		72
200	1.6	700	618	√	√	41
	2.5	700	626	√		117
	4.0	700	634	√		127

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