Digital Gas Vortex Flow Meter

GVF100

PRODUCT DESCRIPTION

GVF100 digital gas vortex flow meter is a flow meter operating with Karman Vortex Street principle for flow rate of gases (air, oxygen, nitrogen, coal gas, natural gas, chemical gas, etc.). It could be used in automatic control system as flow transmitter. The product adopted advanced differential technique, together with measurement of isolating, shielding and filtering, it had possesses better anti-vibration performance and signal stability. GVF100 gas flow meter is also with unique sensor encapsulation and protection technology to ensure service life of the sensor.

FEATURES

- Without movable parts and adopt simple structure, it is very easy to install and maintain the product.
- Sensor output is with pulse signal, there is a linear relation between frequency of the signal and actual flow rate of the medium. The product is with stable performance and no zero drifting, offering pipe and insertion sensor type options.
- Wide measurement range, the highest range ratio could reach to 20:1
- Low pressure loss and consumption.
- Measure components will not contact with medium, which helped the product to maintain stable performance and long service life.
- Assemble with anti-interference circuit and anti-vibration sensors, which could ensure anti-vibration performance of the product.

SPECIFICATIONS

Medium	Air, oxygen, nitrogen, coal gas, natural gas, chemical gas, etc.
Accuracy	Pipe type: Class 1.5 Insertion type: Class 2.5
Medium temperature	-40℃~+350℃
Nominal pressure	≤1.6Mpa (offer ≤2.5Mpa and ≤4.0Mpa customization)
Flow rate	5-60m/s
Output	Voltage pulse, 4-20mA output, HART, Modbus, RS485 options.
Installation	Flange, clamp flange, insertion, threat, clamp connection
Power	12~28VDC 3.6V lithium battery (on site display) 85~265VAC (Remote display)
Operating condition	Temperature: -25℃~60℃ Humidity: 5%~90%
Housing material	1Cr18Ni9Ti

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Confirmation of diameter

Flow range for air measurement under normal temperature and pressure shall be as Fig. 1.

Fig. 1 Air flow range for vortex flow meter

Diameter (mm)	Range (m3/h)	Frequency range (Hz)	Diameter (mm)	Range (m3/h)	Frequency range (Hz)
15	2.2-40	240-2350	200	560~8000	22~315
20	4-60	210-2132	250	890~11000	18~221
25	8-100	190~2300	300	1360~18000	16~213
32	15~150	150~1496	（300）	1560~15600	85~880
40	27~205	140~1040	（400）	2750~27000	85~880
50	35~380	94~1020	（500）	4300~43000	85~880
65	68~680	80~807	（600）	6100~61000	85~880
80	86~1100	55~690	（800）	11000~110000	85~880
100	133~1700	42~536	（1000）	17000~170000	85~880
125	230~2500	38~416	＞（1000）		
150	347~4000	33~380			

Fig. 1 shows flow range under normal temperature and pressure (t0=20℃，P0=0.1MPa，ρ0=1.205Kg/m3，V=15×10-6m2/s).

In case for measurement of air under abnormal temperature and pressure or other gas, the flow range shall be calculated according to specific conditions.

Lower limit of the flow range shall be determined by density during operation and kinematic viscosity of the medium.

Upper limit of the flow range will not be affected by pressure and temperature of the medium.
Hence confirmation of flow range is a process to confirm actual lower limit of the flow range.

Confirmation of actual lower limit

Step 1

Calculate the lower limit density Qρ by formula (1). The lower limit density Qρ will be determined by operating density. When medium density is high, the measurable lower flow rate is low.

Qρ=Q0×　　Formula (1)

In this formula:

Qρ---------- measurable lower flow rate under operating conditions

Q0---------- lower flow rate under reference air density in Fig. 1 (specific value from Fig.1)

ρ0---------- reference air density in Fig. 1, ρ0=1.205Kg/m3

ρ----------density of the medium under operating conditions

Step 2

Calculate the lower limit flow rate Qv by formula (2). The lower limit flow rate Qv will be determined by kinematic viscosity. When kinematic viscosity of the medium is low, the measurable lower limit current is low.

Qv=Q0×v/v0　　Formula (2)

In this formula:

Qv----------lower limit current of the flow meter during the medium measurement

Q0---------- lower flow rate under reference medium viscosity in Fig. 1 (specific value from Fig.1)

V0---------- reference air viscosity in Fig. 1, 15mm2/s

V----------medium viscosity under operating conditions

Step 3

Compare Qv and Qρ and confirm the actual lower limit and linear lower limit flow rate

When Qv≥Qρ the measurable flow range will be Qρ-Qmax; Linear flow range will be Qv-Qmax

When Qv＜Qρ measurable flow range and linear flow range will be Qρ-Qmax

Qmax is the upper limit flow range in Fig. 1

※ **Important note**

Lower limit flow range will be quite high for gas medium with low density and high viscosity under normal temperature and pressure (for example: hydrogen). If the application flow rate is very low, vortex flow meter is probably not suitable. Vortex flow meter only fits this gas type when it is with high pressure and big flow rate under strict calculation of flow range according to steps aforementioned.

TYPE SELECTION

GVF100-	□	□	□	□	□	□	□	□	□	□	Note
Nominal diameter	DNXX										DN15~DN1800 (mm)
Structure		F									Remote type with display
		Y									Compact type with display
Accuracy			A								Pipe type: Class 1.5
			B								Insertion type: Class 2.5
Nominal pressure				16							1.6Mpa
				XX							Customization
Max. temp. of medium					M						＜250℃
					H						＞250℃
Other function						P					With pressure compensation
						T					With temperature compensation
						PT					With pressure and temperature compensation
Power							1				12~28VDC
							2				3.6V lithium battery (on site display)
							3				85~265VAC (Remote display)
Output								A			4-20mA
								M			Voltage pulse
								H			HART
								R2			RS485
Installation									1		Flange
									2		Clamp flange
									3		Insertion
									4		Thread
									5		Clamp
Explosion proof										A	No explosion proof
										B	Intrinsic explosion proof
										G	Flame proof

Note for type selection

GVF100 digital gas vortex flow meter is mainly applicable for measurement of air, oxygen, nitrogen, coal gas, natural gas, chemical gas, etc.

Type selection process

Select main model and structure first, then ensure other specifications according to requirement, i.e. main model + nominal diameter + structure + accuracy + nominal pressure + Max. temperature of the medium + more function + power + output + installation + explosion proof.