Datasheet

Vortex Flow Meter

SUP-LUGB

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Vortex Flow Meter
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The vortex flow meter is a flow meter that applies the Karman vortex principle. It is used to measure the flow of liquid, gas, and steam, and can also measure turbid liquid containing tiny particles and impurities. It is widely used in petroleum, chemical, pharmaceutical, papermaking, Metallurgy, electric power, environmental protection, food, and other industries.

Applications

- Petroleum
- Chemical
- Pharmaceutical
- Paper industry
- Metallurgy
- Electric power
- Environmental protection
- Food and beverage

Vortex Flow Meter

Features

- Ability to measure flow accurately and reliably.
- Low maintenance requirements.
- Easy to install and operate.
- Offer excellent long-term stability.
- Small pressure loss, wide range, high-accuracy.
- It has both analog standard signals and digital pulse signal output to match with computers and other digital systems.

Principle

The vortex flow meter measures the flow of steam, gas and low-viscosity liquid based on the theory of Kamen and Strohal about the generation of vortex and the relationship between vortex and flow. As shown in Figure 1, a triangular column is vertically inserted into the body, which is the source of the vortex. When the medium flows through the body, Karman vortices with opposite directions and regularity are alternately generated behind the triangular column. The separation frequency of the vortex is F It is proportional to the flow velocity V of the medium. By detecting the number of vortices through the sensor head, the fluid flow rate can be measured, and then the volume flow rate of the measured medium can be calculated according to the diameter of the meter body.

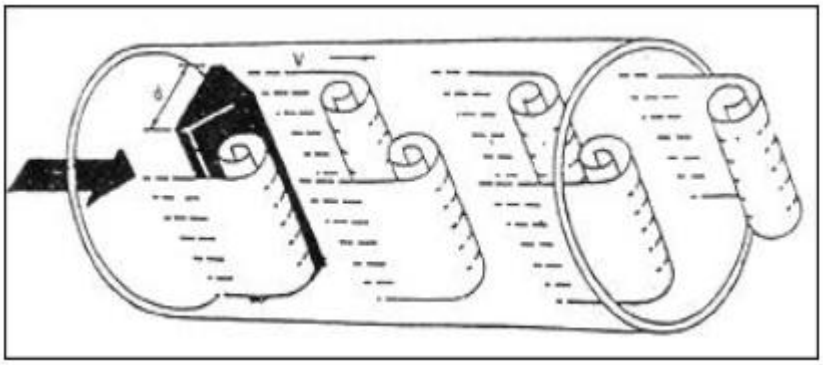


Figure 1

Calculated as follows:

F=St*V/md……Formula 1

Q=3600*F/K……Formula 2

M=Q*ρ…… Formula 3

In the formula:

1. F...the vortex frequency generated by the fluid flowing through the triangular column of the vortex flow meter (unit: Hz)
2. St...Strohal's constant (dimensionless)
3. V... the average velocity of the fluid in the pipeline (unit: m/s)
4. m...The ratio of the arc flow area on both sides of the triangular column to the cross-sectional area of the measuring pipe (unit: dimensionless)
5. d...Width of the upstream surface of the triangular column in the meter body of the vortex flow meter (unit: m)
6. D...The inner diameter of the vortex flow meter meter (unit: m)
7. Q...Instantaneous volume flow rate (unit: m3/h)
8. K...The instrument coefficient of the vortex flow meter (unit: number of pulses/cubic meter)
9. M...Instantaneous mass flow rate (unit: kg/h)
10. ρ….fluid density (unit: kg/m3)
11. Note: The vortex flow meters with different calibers have different instrument coefficient K values,

and the specific values are obtained through the actual calibration of the flow calibration device. That is, the number of pulses output by the sensor for one cubic meter of fluid flowing through the working condition.

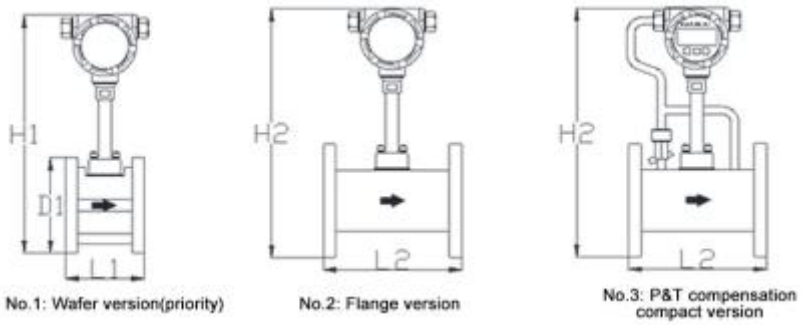
Parameters	
Physical Parameters	
Items	Main parameters
Measuring medium	Liquid, gas, steam (saturated steam, superheated steam)
Nominal diameter	DN15-DN300
Accuracy	Gas non-compensated type: DN15-DN25--1.5%, DN32-DN200--1.0%, DN250-DN300--1.5% Liquid non-compensated type: DN15-DN300--1.0% Temperature and pressure compensation type: DN25-DN300--1.5%
Turndown ratio	When the gas density is 1.2 kg/m3, the turndown ratio is 8:1 When the liquid density is 1000kg/m3, the turndown ratio is 8:1 When the medium density is different, the turndown ratio will change
Nominal pressure	Flange clamp installation--DN15-DN300 (preferred pressure level 2.5MPa); Flange connection - DN15-DN50 (preferred pressure level 2.5MPa); Flange connection - DN65-DN200 (preferred pressure level 1.6MPa); Flange connection--DN250-DN300 (preferred pressure level 1.0MPa) Note: Flange connection type vortex flange implements the national standard GB/T9119-2010; the preferred pressure level is the factory default pressure level, and other pressure levels or other flange standards can be supplied by agreement;
Medium temperature	-40℃~+150℃; -40℃~+260℃; -40℃~+300℃
Ambient temperature	-20°C-+55°C (common type)
Relative humidity	5%-90%RH
Atmospheric pressure	86kPa~106kPa
Electrical interface	M20*1.5 internal thread (other types of connectors can be supplied by agreement)
Protection grade	IP65 (IP67, IP68 can be supplied by agreement)
Body material	Stainless steel (other materials are supplied by agreement)
Pressure loss	△P≤1.2ρ work V2 (△P unit is Pa; ρ work unit is kg/m3; V unit is m/s)
Calibration method	When the flow meter of our company is calibrated at the factory, the downstream pressure of the flow meter is taken
Electrical Parameters	
Items	Main parameters
Working power	24VDC±5% or lithium battery 3.6 VDC (battery service life ≥ 2 years); optional

Load resistance	When outputting current, the load resistance must be ≤300Ω (including wire resistance)
Display	Intelligent character display type -- two-line liquid crystal character display, which can display instantaneous flow and cumulative flow at the same time; Intelligent dot-matrix display type -- 128*64 dot-matrix liquid crystal display in Chinese or English, which can display instantaneous flow, cumulative flow, working temperature, working pressure, battery voltage, working density, working volume flow, output signal, menu number of revisions, etc.;
Communication	RS485 (Optional, Standard MODBUS-RTU Protocol)
Temperature sensor type	Three-wire PT100
Pressure sensor type	Four-wire diffused silicon pressure sensor
Temperature display accuracy	Better than 0.2%F.S
Pressure display accuracy	Better than 0.2%F.S
Density calculation accuracy	Better than 0.1%
Calculation accuracy of compressibility factor	Better than 1%
Temperature compensation	No compensation, temperature compensation, pressure compensation, temperature and pressure compensation can be set arbitrarily

Dimension

Product Dimension:

SUP-LUGB-B Vortex flow meter max configuration size fig. (unit: mm)



No.1: Wafer version(priority) No.2: Flange version No.3: P&T compensation compact version

SUP-LUGB-B Vortex flow meter max configuration size table (unit: mm)

Size / DN	H1[a]	H1[b]	H1[c]	D1	L1	H2[a]	H2[b]	H2[c]	L2
DN15	525	445	355	45	65	540	460	370	170
DN20	531	451	361	58	65	545	465	375	170
DN25	531	451	361	58	65	550	470	380	250
DN32	531	451	361	58	65	563	483	393	250
DN40	529	449	359	85	70	578	498	408	250
DN50	541	461	371	99	70	590	510	420	250
DN65	558	478	388	118	70	612	532	442	250
DN80	573	493	403	132	70	625	545	455	280
DN100	595	515	425	156	70	644	564	474	300
DN125	621	541	451	184	70	674	594	504	350
DN150	647	567	477	211	70	703	623	533	350
DN200	705	625	535	266	98	757	677	587	400
DN250	757	677	587	319	114	810	730	640	450
DN300	808	728	638	370	130	860	780	690	500

Note: This product has three kinds of pillars a, b, c, different lengths, you can check the height of the entire table corresponding to the H mark on the table above.
150℃ sensor head without compensation vortex, use pillar c; 150℃ sensor head with compensation vortex, use pillar b;
For 260°C sensor head vortex, use pillar b; for 300°C sensor head vortex, use pillar a.

Ordering code

SUP-LUGB-DNXX -I1-MM1-J7-F1-C0-P2-T1-IP1															Description
SUP-LUGB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pipe size	DNXX														DN15-DN300
Installation		I1													Flange installation
		I2													Clamping installation (stainless steel flange card installation, no temperature and pressure compensation)
		I3													Clamping installation (carbon steel flange card installation, no temperature and pressure compensation)
Medium			MM1												Liquid
			MM2												Gas
			MM3												Steam
Accuracy				J7											1.5% (Gas, without compensation: DN15-DN25, DN250-DN300; temperature and pressure compensation: DN25-DN300)
				J6											1.0% (Liquid: DN15-DN300; Gas without compensation: DN32-DN200)
Amplifier type					F1										24V power supply + no display + pulse/4-20mA output (no temperature and pressure compensation)
					F2										3.6V battery power supply + with display + pulse/4-20mA output (no temperature and pressure compensation)
					F3										24V power supply + display + pulse / two-wire 4-20mA output (no temperature and pressure compensation)
					F4										24V/3.6V battery power supply + with display + pulse / 4-20mA output (optional temperature and pressure compensation)

								24V/3.6V battery power supply + with display + pulse / 4-20mA output + RS485 (optional temperature and pressure compensation)
							F5	
								24V power supply + with display + pulse / three-wire 4-20mA output (optional temperature and pressure compensation)
							F6	
								24V power supply + display + pulse / three-wire 4-20mA output + RS485 (optional temperature and pressure compensation)
							F7	
								24V power supply + display + pulse / two-wire 4-20mA output + Hart communication (with temperature and pressure compensation)
							F8	
								24V power supply + display + pulse / two-wire 4-20mA output + Hart communication (without temperature and pressure compensation)
							F9	
						C0		No compensation
						C1		On-site display type
						C2		Temperature compensation (limited to flange connection above DN25, Pressure compensation (limited to flange connection above DN25)
						C3		Temperature and pressure compensation (limited to flange connection above DN25)
					P2			1.0 MPa
					P3			1.6 MPa
					P4			2.5 MPa
					P5			4.0 MPa
					PZ			Other nominal pressure
				T1				-40℃-150℃
				T2				40℃-260℃
				T3				-40℃-300℃

Protection grade	IP1						IP65
	IP2						IP67
	IP3						IP68