



Vortex Flow Meter

Datasheet

SUP-LUGB

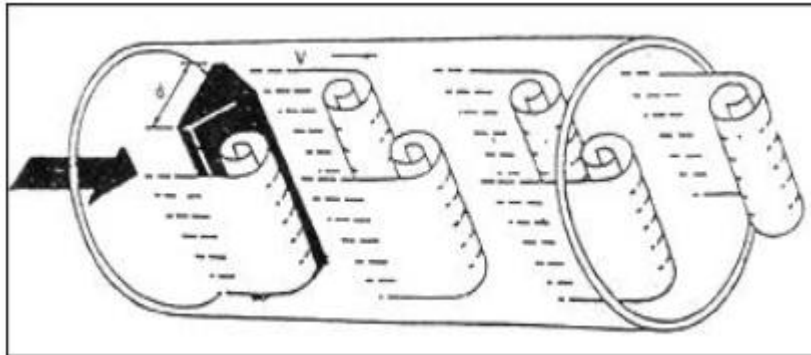
SUP-LUGB Vortex Flowmeter is on the principle of Karman street, to measure liquid, gas and vapor even turbid liquid including micro grain and impurity. Applications: petroleum, chemical industry, paper making, metallurgy, electric force, environmental protection, food industry and etc.

Features

- small pressure loss, wide range, high accuracy;
 - It is hardly affected by fluid density, pressure, temperature and viscosity when measuring volume flow under working status;
 - No moving mechanical parts, thus high reliability and low maintenance. Instrument parameters can be stable for long term.
 - Vortex flowmeter can be used in a temperature range of $-40^{\circ}\text{C} \sim +400^{\circ}\text{C}$.
 - It has both analog standard signals and digital pulse signal output to match with computers and other digital systems.
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Working principles

Set bluff body in the fluid, two columns of regular vortex are alternately generated from both sides of bluff body. This vortex is called Karman vortex.



Alternating and regular vortex columns are formed at downstream of the bluff body. They existing the following relationship:

$$\text{Formula 1 : } f = StV/d$$

In the formula:

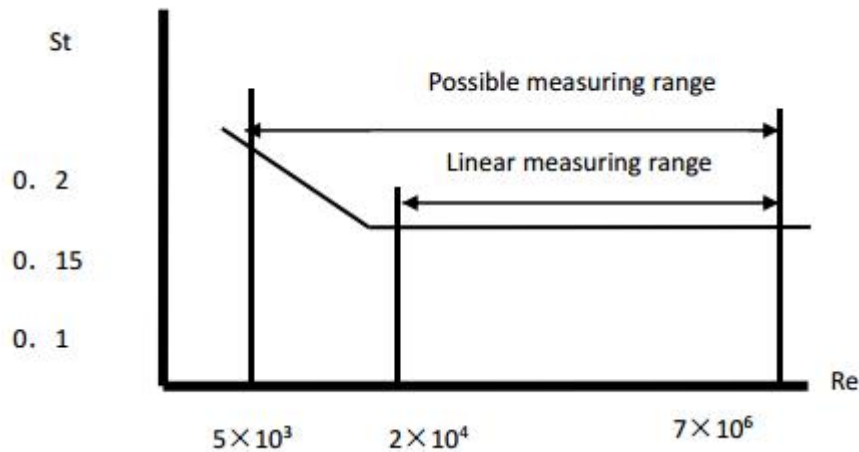
f - Karman vortex frequency generated at one side of bluff body (HZ)

St - strouhal number (non-dimensional number)

V - average speed of fluid (m/s)

d - width of bluff body (m)

the Strouhal number (st) is a dimensionless unknown. The figure below shows the relationship between Strouhal number (St) and Reynolds number (Re).



In the curve table, the flat part of $St = 0.17$, the release frequency and velocity are proportional, that is the measuring range of vortex flow sensor. As long as the frequency f is detected, the flow velocity of fluid in the pipe can be obtained. Volume flow rate is determined by the velocity V . The ratio of measured pulse number and the volume is called meter constant (K), see Formula 2.

Formula 2 : $K = 3600 f/Q$ (1/m³)

In the formula:

K = meter constant (m⁻³)

f =pulse number

Q = Volumetric flow (m³)

Technical Specification

Nominal Diameter (mm)	15, 20, 25, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300
Nominal pressure (MPa)	DN15-DN200 PN40, DN250 - DN300 PN16 (special ordering for other pressure rating)
Medium temperature (°C)	Piezoelectric type: -40 to 150, -40 to 260, -40 to 330; Capacitance type: -40 to 400
Body material	SS304
Allowed vibration acceleration	Piezoelectric type: 0.2g;
Capacitance type:	1.0-2.0 g
Accuracy	$\pm 1\%R, \pm 1.5\%R$; Insertion type: $\pm 2.5\%R$
Turndown	1:6 to 1:25
Power Voltage	Sensor: +12V DC, +24V DC; transmitter: +12V DC, +24V DC; Battery operated type: 3.6V battery
Output	Pulse: high level $\geq 5V$, low level $\leq 1V$; current: 4-20mA
Pressure loss factor	Conforming to JB/T9249 standard $Cd \leq 2.4$
Ex	Intrinsically safe: Ex ia II CT2-T4 Isolation explosion type: Exd II CT2-T5
Protection Grade	IP65, IP68
Ambient conditions	Temp. -20°C to 55°C , relative humidity 5% to 90%, atmospheric pressure 86 to 106 KPa
Applicable mediums	Gas, liquid and steam
Transmission distance	3 wire pulse output: $\leq 300m$, 2 wire current output (4-20mA) $\leq 1500m$; Load resistance $\leq 500\Omega$; RS485 / HART $\leq 1200m$

Instrument Flow Range

1. Reference conditions:

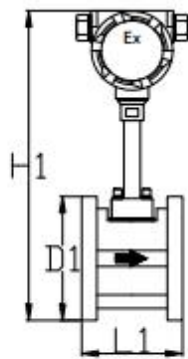
Gas: air under normal temperature and normal pressure, $t = 20\text{ }^{\circ}\text{C}$, $P = 0.1\text{ MPa}$
(absolute pressure), $\rho = 1.205\text{ kg/m}^3$, $v = 15 \times 10\text{ m/s}$

Liquid: water under normal temperature: $t = 20\text{ }^{\circ}\text{C}$, $\rho = 998.2\text{ kg/m}^3$, $v = 1.006 \times 10\text{ m/s}$

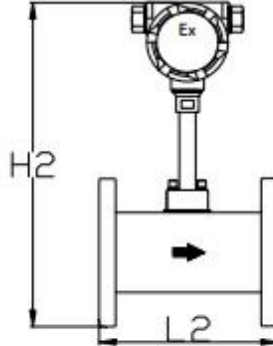
2. Flow range under reference conditions given as below:

Diameter (mm)	Liquid		Gas	
	Measuring range (m ³ /h)	Frequency output range (Hz)	Measuring range (m ³ /h)	Frequency output range (Hz)
15	0.3~5	35~450	4~20	300~1600
20	0.6~10	29~380	6~30	230~1200
25	1.2~16	25~320	8~55	170~1100
32	1.8~20	18~200	10~120	100~1180
40	2~40	10~190	27~205	130~1040
50	3~60	8~150	35~380	94~920
65	4~85	6~120	60~640	90~910
80	6.5~130	4.1~82	86~1100	55~690
100	15~220	4.7~69	133~1700	42~536
125	20~350	3.2~57	150~2000	38~475
150	30~450	2.8~43	347~4000	33~380
200	45~800	2~31	560~8000	22~315
250	65~1250	1.5~25	890~11000	18~221
300	95~2000	1.2~24	1360~18000	16~213

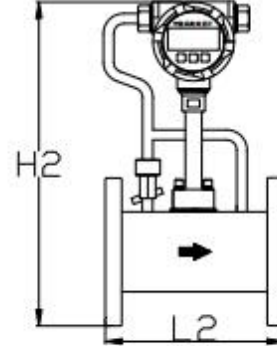
Instrument Sketch Classification and Dimensions



Flanges clamping type



Flanges connection type

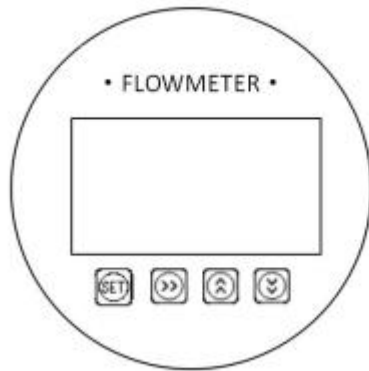


P&T compensation
compact version





Caliber	H1	H2	D1	L1	L2
DN15	515	530	45	65	170
DN20	521	535	58	65	170
DN25	521	540	58	65	250
DN32	521	553	58	65	250
DN40	519	558	85	70	250
DN50	531	570	99	70	250
DN65	548	592	118	70	250
DN80	563	605	132	70	280
DN100	585	623	156	70	300
DN125	611	653	184	70	350
DN150	637	680	211	70	350
DN200	695	736	266	98	400
DN250	747	790	319	114	450
DN500	798	840	370	130	500

Operation Instruction

1. Interface



2. Key functions

-  key (K1): Enter the setting status and confirm the setting value;
-  key (K2): moves the cursor position to the next loop;
-  key (K3): Add 1 or function selection to the value of the cursor;
-  key (K4): Returns to the previous menu item.

3. Menu

press key (K1) to enter the menu.

Press (K2) to cycle through the menus and press (K1) to enter.

4. Parameter settings

In the menu, press key (K1) to enter the password verification interface. After entering the correct password, you can set the parameters.

Ordering code

Vortex flowmeter																		
Model											Description							
-	-	-	-	-	-	-	-	-	-	-	-	-						
LUGB-SUP													-					
Medium	MM1												Liquid					
	MM2												Gas					
	MM3												Steam					
Nominal pipe size			DNXX										DN15 - DN300					
Accuracy				J1									1.5%(Gas、Steam)					
				J2											1.0%(Liquid)			
Display				DT0									Without display					
				DT1											With display			
Output					O0								No output					
					O1											Pulse output		
					O2												4-20mA output	
Communication output					D0								No output					
					D1											RS232		
					D2												RS485	
					D3												HART	
Compensation type					C0								No compensation					
					C1											Temperature compensation		
					C2												Pressure compensation	
					C3												Temp & pressure compensation	
Installation					I2								Flange installation					
					I3												Wafer connection	
Power supply					V1								3.6V lithium battery					
					V2												24VDC	
					V3												24V & 3.6V lithium battery	
Pressure rating					P1								1.0MPa					
					P2												1.6MPa	
					P3												2.5MPa	
					P4													4.0MPa
					PZ													Others
Temperature rating					T1								-40°C - 260°C					
					T2												-40°C - 300°C	



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