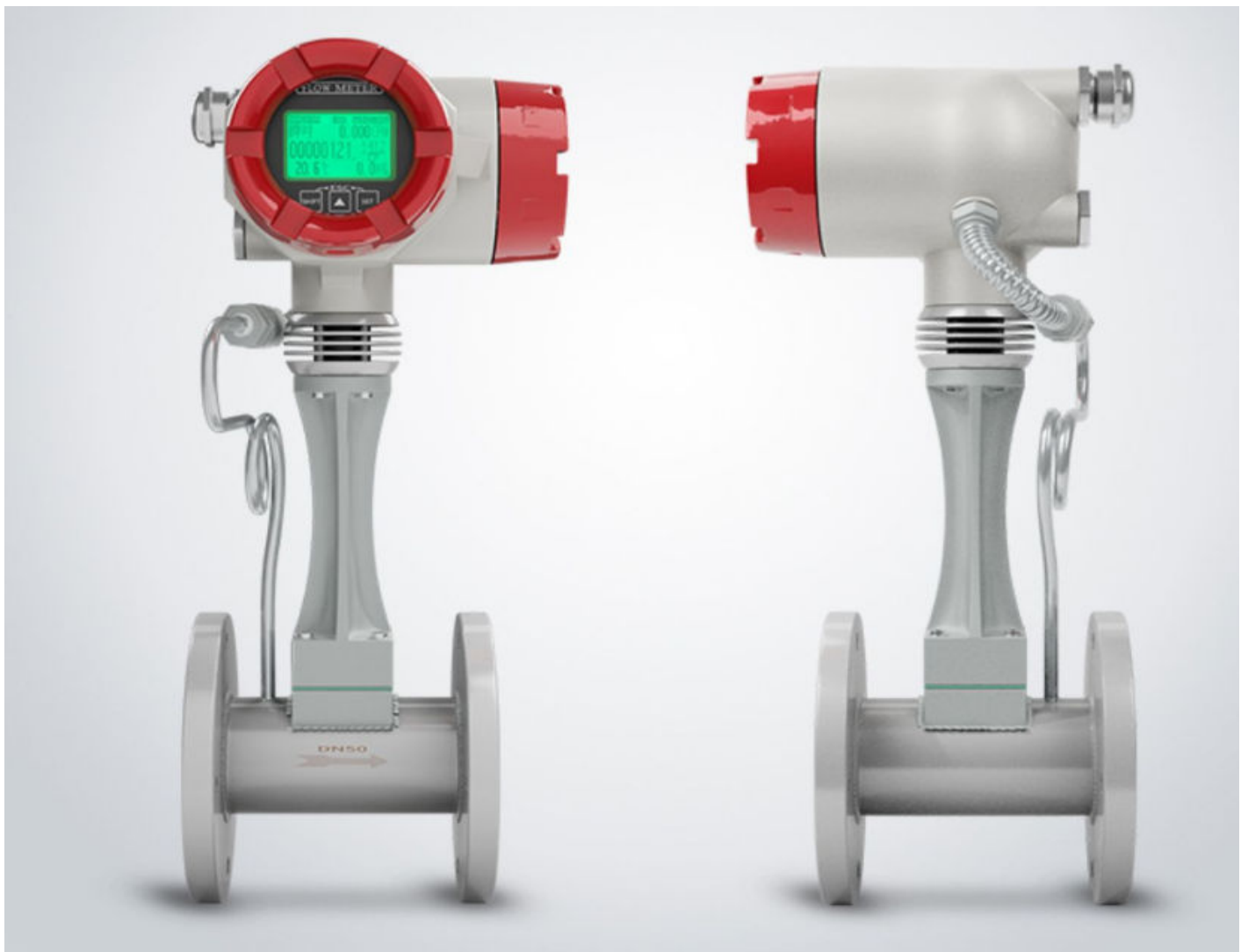




Vortex Flow Meter

Committed to process automation solutions

Datasheet



LUGB-SUP-C

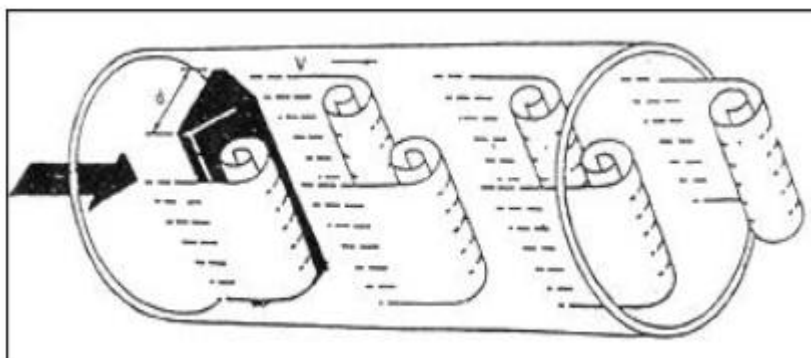
SUP-LUGB Vortex flow meter is on the principle of Karman street, to measure liquid, gas and vapor even turbid liquid including micro grain and impurity. Applications: petroleum, chemical industry, paper making, metallurgy, electric force, environmental protection, food industry and etc.

Features

- The product has high reliability, long-term stability, simple structure and easy maintenance;
- The zero point has no drift, and the performance is very stable.
- Various structural forms, including pipeline type, plug-in flow sensor and other forms;
- Small pressure loss, high accuracy,
- Flexible installation
- The circuit adopts a variety of protection modes, which is anti-surge and has strong adaptability;
- 316L stainless steel sensor housing
- Long life lithium battery
- High and low temperature adaptability
- The measurement range is wide, and the range ratio can reach 1:10~1:25.

Principle

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.



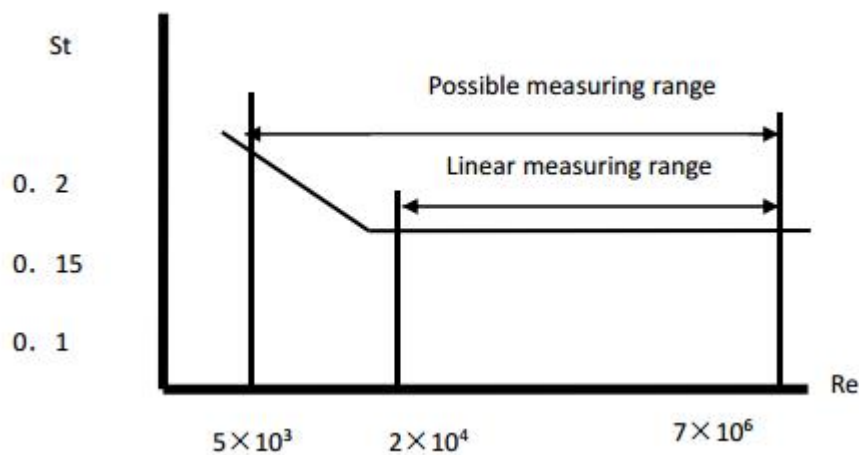
Alternating and regular vortex columns are formed at downstream of the bluff body. They existing the following relationship:

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

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.

$$\text{Formula 2 : } K = 3600 f/Q \text{ (1/m}^3\text{)}$$

In the formula:

K = meter constant (m⁻³)

f =pulse number

Q = Volumetric flow (m³)

Product Introduction

Nominal Diameter (mm)	DN15-DN300, DN300-DN1000 (Insertion type)
Nominal pressure wafer connection	DN15-DN50 (priority PN4.0MPa) DN65-DN100 (priority PN2.5MPa) >DN125 (priority PN1.6MPa)
Nominal pressure flange connection	DN15-DN50 (priority PN2.5MPa) DN65-DN300 (priority PN1.6MPa) (Can be used in negative pressure environment)
Medium temperature (°C)	-40°C ~ 100°C; -40°C ~ +250°C; -40°C ~ +330°C;
Ambient temperature	-20~55°C
Relative humidity	5%~90%
Atmospheric pressure	(86~106)kPa
Main body material	Stainless steel 304
Accuracy	±1.5%R; Insertion type: ±2.5%R, Temperature: ±0.8°C Pressure: ±0.3%FS
Range ratio	1: 6~1: 25
Power Voltage	24VDC; 3.6V Li battery
Output	Pulse, 4~20mA
Communication	RS485, Modbus-RTU
Ingress protection	IP65
Pressure lose	Comply with JB/T9249 standard $Cd \leq 2.4$
Electrical Interface	M20*1.5 or others
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 $\leq 1200m$

Instrument Flow Range

1. Reference conditions:

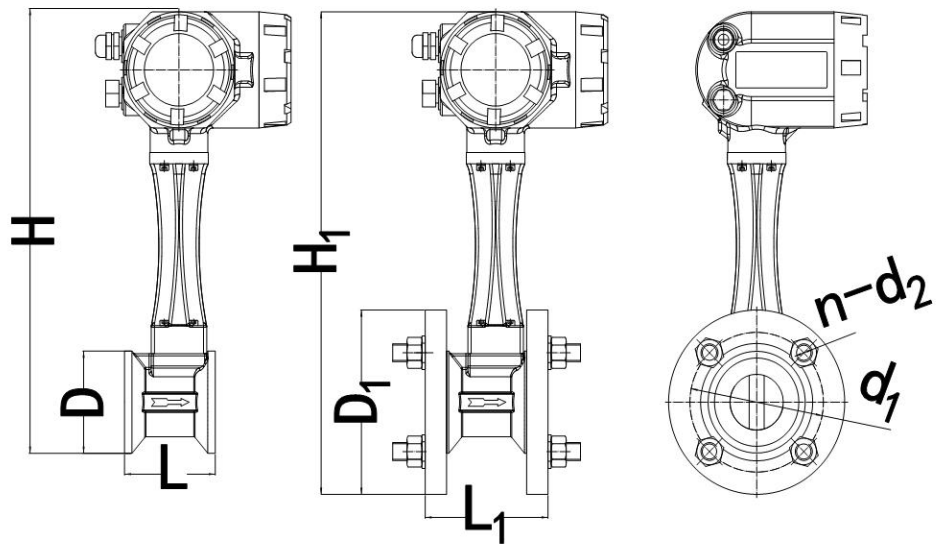
Gas: air under normal temperature and normal pressure, $t = 20\text{ }^{\circ}\text{C}$, $P = 101.32\text{kPa}$ (absolute pressure), $\rho = 1.205\text{ kg/m}^3$

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

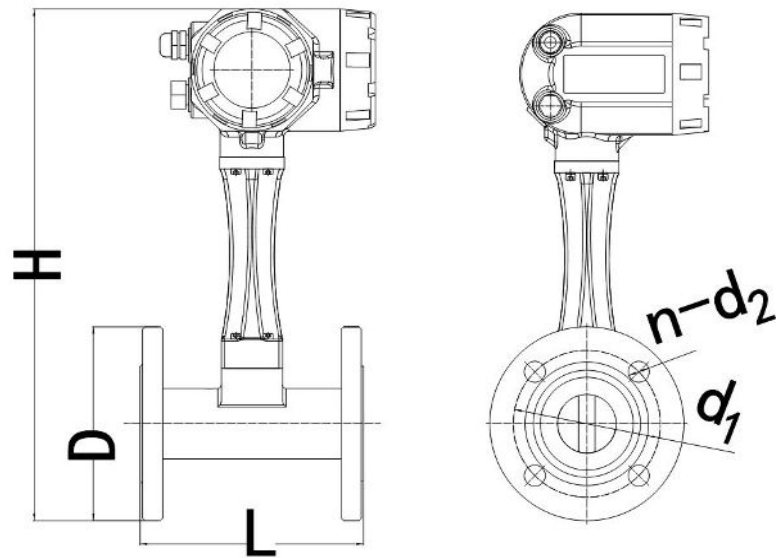
2. LUGB Vortex flowmeter measure saturated steam of different density corresponding with flow range under working condition:

DN(mm)	Liquid		Gas		
	Range(m ³ /h)	Output frequency range(Hz)	Range(m ³ /h)	Output frequency range(Hz)	Expand range (m ³ /h)
15	0.5~5	35~600	3~10	300~1240	3~13
20	0.6~10	29~420	6~24	220~1250	6~30
25	1.2~16	21~210	9~48	190~1140	8.8~52
32	1.8~20	18~264	10~00	156~1080	10~170
40	2~40	10~200	27~150	140~1040	27~205
50	3~60	8~160	40~320	94~1020	35~380
65	4~85	6~120	60~480	94~910	60~700
80	6.5~130	4.1~82	90~720	55~690	86~1100
100	15~220	4.7~69	150~1050	42~536	133~1700
125	20~350	3.2~57	200~2200	38~475	150~2800
150	30~450	2.8~43	350~2500	33~380	347~4000
200	45~800	2~31	600~4000	22~315	560~8000
250	65~1250	1.5~25	900~7000	18~221	890~11000
300	95~2000	1.2~24	1400~11000	16~213	1360~18000
(300)	100~1500	5.5~87	1560~15600	85~880	
(400)	180~3000	5.5~87	2750~27000	85~880	
(500)	300~4500	5.5~87	4300~43000	85~880	
(600)	450~6500	5.5~88	6100~61000	85~880	
(800)	750~10000	5.5~88	11000~110000	85~880	
(1000)	1200~17000	5.8~88	17000~170000	85~880	

Instrument Dimensions



Wafer connection



Flange connection

Wafer connection dimensions

DN	Pressure MPa	L(mm)	L ₁ (mm)	D mm	D ₁ mm	H mm	H ₁ mm	d ₁ mm	d ₂ mm	n Holes
DN15	0~4.0	70	95	55	100	366	393	78	14	3
DN20		70	95	55	100	366	393	78	14	3
DN25		70	95	55	100	366	393	78	14	3
DN32		70	95	55	100	366	393	78	14	3
DN40		85	113	80	140	378	405	105	18	4
DN50		85	113	90	145	387	418	115	18	4
DN65	0~1.6	85	113	105	165	402	438	130	18	4
DN80		85	113	120	180	417	453	145	18	6
DN100		85	113	140	210	437	478	175	18	6
DN125		85	119	165	235	462	503	200	18	8
DN150		100	132	194	270	489	533	230	22	8
DN200		100	132	248	325	541	588	285	22	8
DN250		115	151	300	375	592	638	330	24	10
DN300		130	166	350	425	642	688	380	24	10

Note: ①The above dimensions are the dimensions without temperature and pressure compensation, the error is $\pm 2\text{mm}$, the temperature and pressure compensation dimension DN15-DN32 length L/L₁ increases by 15mm;

②Medium and high temperature ($\geq 100^\circ\text{C}$), increase the height by 30mm (one heat sink);

Flange connection dimensions

DN mm	Pressure MPa	L (mm)	D (mm)	H (mm)	d1 (mm)	d2 (mm)	n Holes
DN10	0~4.0	170	90	395	60	14	4
DN15		170	95	397	65	14	4
DN20		170	105	402	75	14	4
DN25		170	115	407	85	14	4
DN32		170	140	420	100	18	4
DN40		170	150	425	110	18	4
DN50		170	165	432	125	18	4
DN65	0~1.6	190	185	455	145	18	8
DN80		190	200	470	160	18	8
DN100		200	220	490	180	18	8
DN125		200	250	520	210	18	8
DN150		200	285	550	240	22	8
DN200		200	340	605	295	22	12
DN250		240	405	665	355	26	12
DN300	240	460	715	410	26	12	

Note: For medium and high temperature ($\geq 100^{\circ}\text{C}$),
Increase the height by 30mm (one heat sink).

Ordering code

Vortex Flow Meter

Vortex Flow Meter															
Model											Description				
-	-	-	-	-	-	-	-	-	-	-	-				
LUGB-SUP												-			
Medium	MM2											Gas			
	MM3											Steam			
Nominal pipe size		DNXX										DN15 - DN300			
Sensor type			ST1									Piezoelectric sensor(Standard)			
			ST2										Capacitive sensor(high temp and pressure)		
Installation			I1									Flange connection			
			I2										Wafer connection		
			I3											Insertion type	
			I4											Ball valve Insertion type	
			I5											Threaded connection	
			I6											Clamp connection	
Accuracy			J7									1.5%(Steam, Gas)			
			J9										2.5%(Insertion type)		
Amplifier type			F1									Three-wire(24V pulse output)			
			F2										Two-wire current (24V power supply 4~20mA current output, LCD display)		
			F3											Battery (3.6V lithium battery / dual power supply + pulse output on-site LCD display (dual power supply + D))	
			F4											24V power supply (PT temperature and pressure compensation integrated, 4~20mA current/pulse output)	
			F5											24V power supply integrated (T temperature compensation, 4~20mA current/pulse output)	
			F6											24V power supply (P pressure compensation, 4~20mA current/pulse output)	
			F7											3.6V battery (PT temperature and	

						pressure compensation, pulse output)
	F8					3.6V battery (T temperature compensation, pulse output)
	F9					3.6V battery (P pressure compensation, pulse output)
	F10					24V/3.6V battery power supply (PT temperature and pressure compensation integrated, 4~20mA current/pulse output)
	F11					24V/3.6V battery power supply (T temperature compensation, 4~20mA current/pulse output)
	F12					24V/3.6V battery power supply (P pressure compensation, 4~20mA current/pulse output)
Communication	D0					NO
	D2					RS485
	D3					HART
Nominal pressure	P3					1.6MPa
	P4					2.5MPa
	P5					4.0MPa
	PZ					Other
Temperature rating	T1					Normal temperature (-40~100)°C
	T2					Medium temperature (-40~250)°C
	T3					High temperature (-40~330)°C
	T4					High temperature (-40~400)°C
Ingress protection					IP1	IP65

