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- Electromagnetic flowmeter
- **Vortex flowmeter**
- Turbine flowmeter
- Ultrasonic flowmeter
- Throttling device
- Rotameter

LUGB

- **Flange connection type vortex flowmeter**
- **Flange card type vortex flowmeter**
- **Temperature-pressure compensation type**
- **Insertion type vortex flowmeter**
- **Sanitary-clamp type vortex flowmeter**



Vortex flowmeter
(Flange connection type)



Vortex flowmeter
(Flange card type)



Vortex flowmeter
(Sanitary-clamp type)



Vortex flowmeter
(temperature-pressure compensation type)

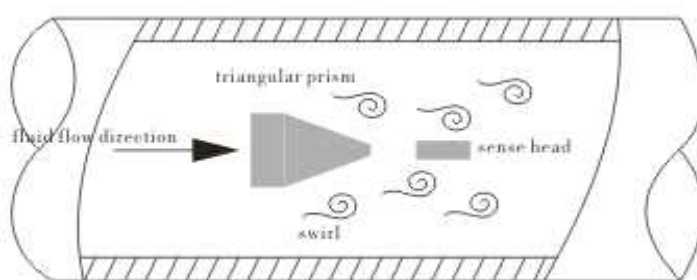


Vortex flowmeter
(inserted type)

Working principle



LUGB-type 2 vortex flow sensor measuring the flow of liquid of steam, gas and low viscosity according to Carman and Strouhal relevant spiral produce and on the theory of the flow relationship. As shown in picture, In the meter body vertical insert a triangular prism root namely the happening of the body, when eddies of medium flow through the table body, in triangular prism behind the alternate produce in opposite directions regular karman swirl, its spiral separation and the flow of the medium frequency F speed by sensing head is proportional to the V detected the number of spiral, can measure the flow velocity, again according to the table body mouth



Computational formula as follows:

$$F = Sr * V / (1 - 1.27 * d/D) \quad \text{formula 1}$$

$$Q = 3600 * F / K \quad \text{formula 2}$$

$$M = Q * p \quad \text{formula 3}$$

- ◆ F The liquid flow through the vortex triangular prism produce the vortex frequency(unit:Hz)
- ◆ Sr Strouhal number(unit:dimensionless)
- ◆ V Internal of pipe fluid flow rate(unit:m/s)
- ◆ d the width of Vortex meter internal triangular prism(unit:m)
- ◆ D Vortex meter inner diameter(unit:m)
- ◆ Q Instantaneous volume flow rate(unit:m³/h)
- ◆ K Vortex of meter coefficient(unit:pulse number/m³)
- ◆ M Instantaneous quality flow rate(unit:kg/h)
- ◆ P Fluid density(unit:kg/m³)

Working principle



- ◆ 1.The accuracy level:1.0
- ◆ 2.Nominal pressure:1.6MPa,2.5MPa,4.0MPa etc
- ◆ 3.The pressure loss:resistance coeffici-ent $CD \leq 2.4$
- ◆ 4.Be measured medium temperature:-40℃~350℃
- ◆ 5.Power supply:12~24VDC
- ◆ 6.EX-proof Class:ExiaIICT6
- ◆ 7.Output signal:Voltage pulse low level $\leq 1V$ high voltage $\geq 6V$ standard current signal 4~20mA

Flow range



(1)Liquid and the flow range of working condition gas

Size(mm)	Water	Normal pressure and temperature air(NPT Air)
	standard measuring range(m³/h)	standard measuring range(m³/h)
25	1.3~13	8~60
32	1.5~15	14~100
40	3~30	18~180
50	4~40	30~300
65	6~60	50~500
80	13~130	70~700
100	20~200	100~1000
125	36~360	150~1500
150	50~500	200~2000
200	100~1000	400~4000
250	150~1500	600~6000
300	200~2000	1000~10000

(2)the quality flow range of saturated steam(kg/h)

Absolute pressure(MPa)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	2.0
Temperature(°C)	120.23	133.54	143.62	151.84	158.94	164.96	170.41	175.36	179.88	187.96	19.84	212.37
Density(kg/m³)	1.129	1.651	2.163	42.669	3.170	3.667	4.162	4.655	5.147	6.127	7.602	1.005
DN25 standard low limit	14	17	19	22	23	25	27	28	30	33	36	42
DN25 standard high limit	140	170	190	220	230	250	270	280	300	330	360	420
DN32 standard low limit	26	30	34	38	41	44	47	50	52	57	63	73
DN32 standard high limit	260	300	340	380	410	440	470	500	520	570	630	730
DN40 standard low limit	31	38	44	48	53	57	60	64	67	73	82	94
DN40 standard high limit	310	380	440	480	530	570	600	640	670	730	820	940
DN50 standard low limit	52	63	73	81	88	95	101	107	112	122	136	157
DN50 standard high limit	520	630	730	810	880	950	1010	1070	1120	1220	1360	1570
DN65 standard low limit	90	106	121	134	146	158	168	178	187	204	227	261
DN65 standard high limit	900	1060	1210	1340	1460	1580	1680	1780	1870	2040	2270	2610
DN80 standard low limit	122	148	170	188	205	221	235	249	261	285	318	365
DN80 standard high limit	1220	1480	1700	1880	2050	2210	2350	2490	2610	2850	3180	3650
DN100 standard low limit	175	212	242	269	293	315	336	355	374	408	454	522
DN100 standard high limit	1750	2120	2420	2690	2930	3150	3360	3550	3740	4080	4540	5220
DN125 standard low limit	262	318	363	404	440	473	504	533	561	612	681	783
DN125 standard high limit	2620	3180	3630	4040	4400	4730	5040	5330	5610	6120	6810	7830
DN150 standard low limit	350	423	484	538	586	631	672	711	747	815	908	1044
DN150 standard high limit	3500	4230	4840	5380	5860	6310	6720	7110	7470	8150	9080	10440
DN200 standard low limit	700	846	969	1076	1173	1261	1344	1421	1494	1630	1815	2088
DN200 standard high limit	7000	8460	9690	10760	11730	12610	13440	14210	14940	16300	18150	20880
DN250 standard low limit	1050	1269	1453	1641	1759	1892	2016	2132	2241	2445	2722	3132
DN250 standard high limit	10500	12690	14530	16410	17590	18920	20160	21320	22410	24450	27220	31320
DN300 standard low limit	1750	2116	2422	2690	2932	3153	3359	3553	3736	4076	4536	5220
DN300 standard high limit	17500	21160	24220	26900	29320	31530	33590	35530	37360	40760	45360	52200

(3)the quality flow flange of superheated steam

Size (mm)	Low limit flow(kg/h)	High limit flow(kg/h)	Size (mm)	Low limit flow(kg/h)	High limit flow(kg/h)
25	$13.1 \sqrt{p}$	$131 \sqrt{p}$	100	$164.7 \sqrt{p}$	$1647 \sqrt{p}$
32	$23.0 \sqrt{p}$	$184 \sqrt{p}$	125	$247.1 \sqrt{p}$	$2471 \sqrt{p}$
40	$26.5 \sqrt{p}$	$265 \sqrt{p}$	150	$329.4 \sqrt{p}$	$3294 \sqrt{p}$
50	$49.4 \sqrt{p}$	$494 \sqrt{p}$	200	$658.8 \sqrt{p}$	$6588 \sqrt{p}$
65	$82.3 \sqrt{p}$	$823 \sqrt{p}$	250	$988.2 \sqrt{p}$	$9882 \sqrt{p}$
80	$115.3 \sqrt{p}$	$1153 \sqrt{p}$	300	$1647 \sqrt{p}$	$16470 \sqrt{p}$

Note:

1.p is the working condition density of superheated steam, the high limit flow rate of superheated steam should not more than 70m/s

2.the pressure loss of sensor in different flow can calculation as follow formula:

$$\Delta P = 1.2 \rho V^2$$

In formula:

ΔP ---Pressure loss (Pa)

ρ ----- Measured the medium of working condition density (kg/m³)

V --- Internal pipe average velocity (m/s)

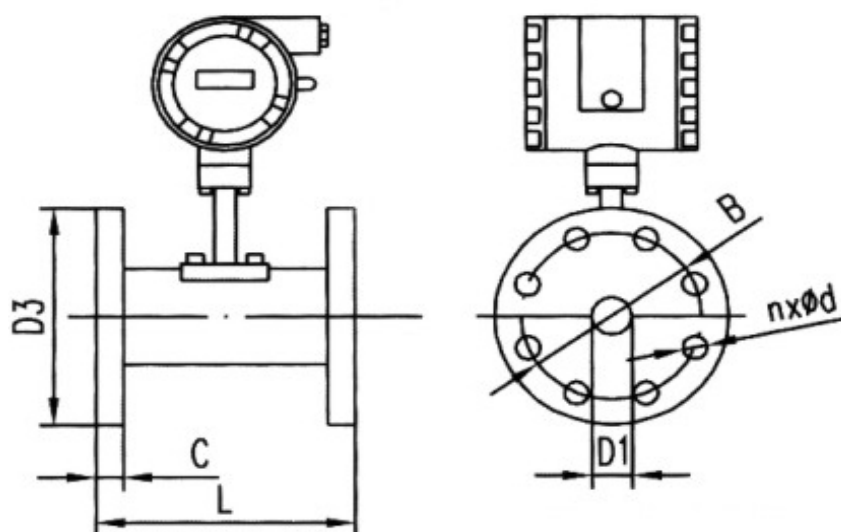
3. When measured the medium is liquid, and in order to prevent gasification or cavitation phenomenon, it should make the absolute pressure of sensor under the working condition requirements for the follow formula:

$$P > 2.6 \Delta P + 1.25 P_i$$

In formula:

P ---measured medium absolute pressure (Pa)

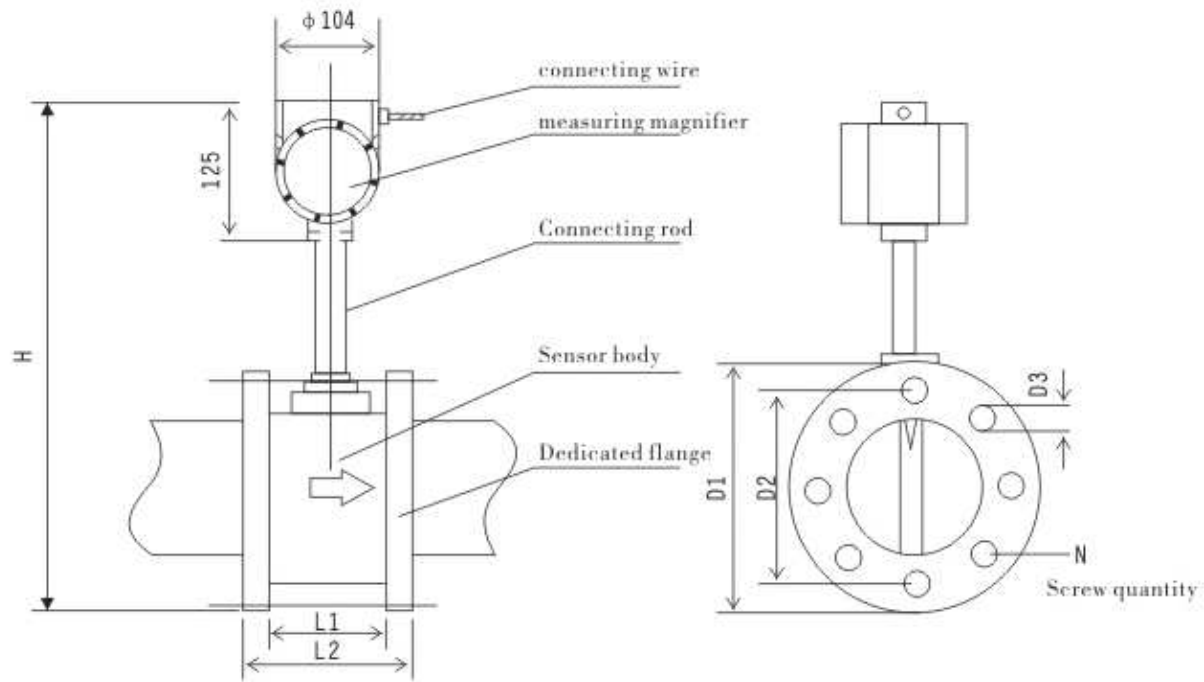
P_i ---Measured the medium under operating temperature condition corresponding the absolute pressure of saturated gas (Pa)



Vortex flowmeter external dimension picture(Flange connection type)

Flange connection type external dimension

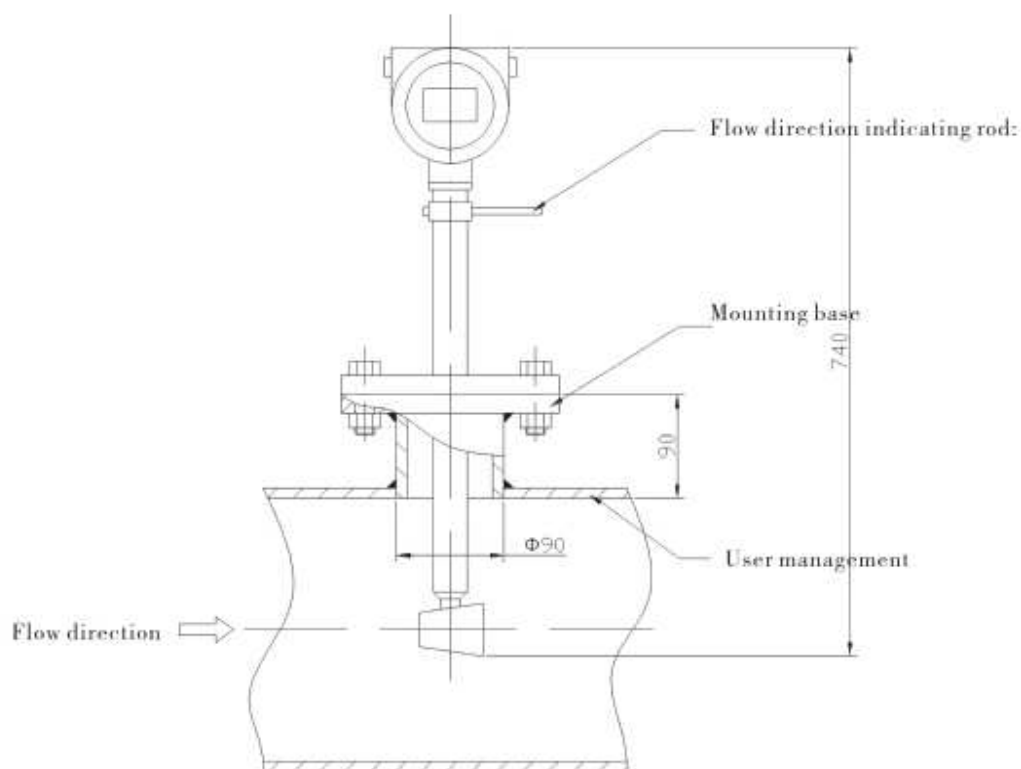
Caliber(mm)	Inner diameter D1(mm)	Length L (mm)	Flange outer diameter D3 (mm)	Center distance of bolt hole (mm)	Flange thickness C (mm)	Bolt hole diameter d (mm)	Screw quantity n (mm)
25	25	170	150	110	18	18	4
32	32	170	155	115	18	18	4
40	40	190	160	120	18	18	4
50	50	190	165	125	20	18	4
65	65	220	185	145	20	18	4
80	80	220	200	160	20	18	8
100	100	240	220	180	22	18	8
125	125	260	250	210	22	18	8
150	150	280	285	240	24	22	8
200	200	300	240	295	26	22	12
250	250	360	405	355	28	26	12
300	300	400	460	410	32	26	12



Flange connection type vortex flowmeter external dimension picture(Flange card installed type)

Flange card installed type external dimension

Caliber	L1	L2	D1	D2	H	D3	N	Caliber	L1	L2	D1	D2	H	D3	N
20	65	95	125	100	460	13	4	100	90	132	230	190	544	17	8
25	65	95	125	100	460	13	4	125	100	146	245	210	564	17	8
40	75	109	145	110	470	13	4	150	120	170	280	240	594	21	8
50	75	109	160	125	481	17	4	200	150	200	335	295	646	21	12
65	75	117	180	145	497	17	6	250	160	214	405	355	708	21	12
80	90	122	195	160	510	17	6	300	170	224	460	410	760	21	12



Insert type vortex flowmeter external dimension and installation picture

Flowmeter structure and external dimension

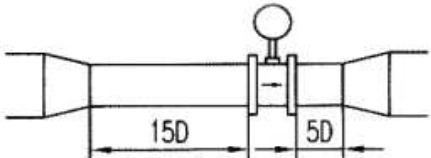
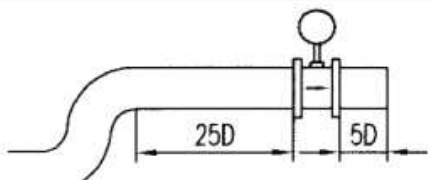
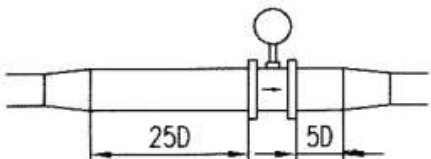
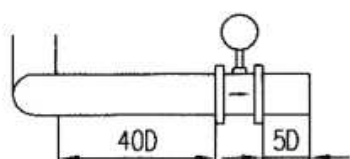
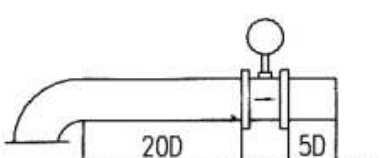
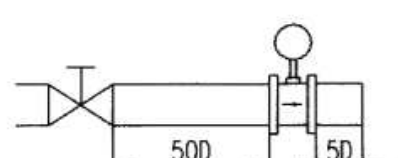


- ◆ Insertion type vortex flowmeter are mainly used for various of industry, industrial pipe large caliber gas, liquid, steam medium flow measurement, its characteristic is structure simple, no move mechanical parts, low pressure loss, measuring range rate is wide, range degrees of 10~15, high price-performance ratio.
- ◆ Pay attention to the installation;
- ◆ Mounting base insert pipe and the insert parts less than pipe inwall
- ◆ Base in pipelines should be correct position, not skewed.
- ◆ Deburring, wipe off welding slag
- ◆ The flange plane of base should be parallel with pipe axis
- ◆ Ensure that medium flow direction and Flow direction indicating rod consistent, forbidden to pull the Flow direction indicating rod.

Assembling conditions



Sensor should be installed in horizontal, vertical, tilt (liquid flow from bottom to top) corresponding with its caliber of pipe, the sensor upstream and downstream should configure a certain length of straight pipe section, and its length should be suitable with the below table

same core contraction and fully open valve		Two 90°C elbows in the same plane	
same core pipe expanding		Two 90°C elbows in the different plane	
One 90°C elbow		Adjustable valve and half-open valve	

before and after straight pipe section

- ◆ Near the Installation liquid sensor of pipeline should be filled with measured liquid
- ◆ Sensor should avoid installed in pipeline which has strong mechanical vibration
- ◆ The inner diameter of the straight pipe section consistnet with sensor caliber as far as possibl,if not consistent,it should use the pipeline which is slightly bigger than sensor caliber
- ◆ When measuring medium which is need to corrected for temperature and pressure,it should be take after the sensor 3 ~ 5 DN distance places as pressure point, and take 5 ~ 8 DN distance places as temperature point
- ◆ The measured medium contains many impurities,it should be add install filters which is in outside of the required length of the sensor straight pipe section upstream
- ◆ Sensor should avoid installed in the place which has a strong electromagnetic interference,small spaces,and maintenance convenient..

Sensor selection



The size of stress type vortex sensor as follows: LUGB-2-X X XX-X

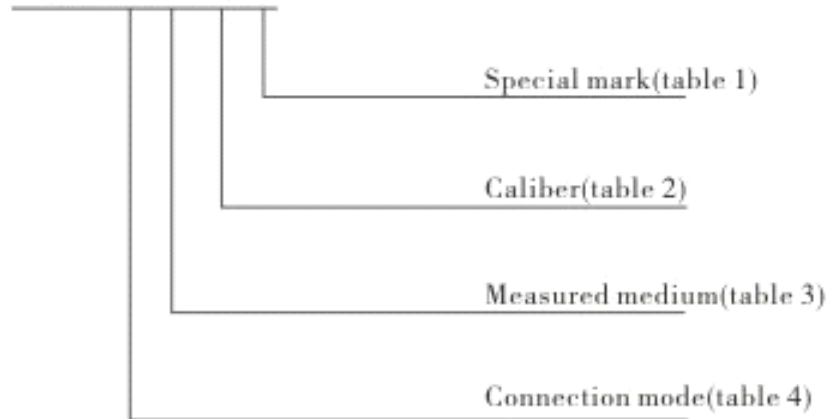


Table 1:special mark

Format	Common	standard signal output	Intrinsically safe explosion-proof	Scene shows	high temperature	temperature compensation	pressure compensation	Temperature re-pressure compensation
Mark No	Mo mark	M	B	X	G	W	Y	Z

Table 2:Caliber

Flange connection type,Flange card installed type

Caliber	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Mark No	150	200	250	320	400	500	650	800	101	125	151	201	251	301

Insreted type

Caliber	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Mark no	10	125	151	201	251	301	351	401	501	601	701	801	901	102	122	142	162	182	202

Table 3:Measured medium

Measured medium	Liquid	common gas	saturated stream	superheated steam	others
Mark No	1	2	3	4	5

Table 4:Connection mode

Connection mode	Flange connection type	Flange card installed type	inserted type	others
Mark No	1	2	3	4