LUGB VORTEX FLOW METER

Summary

LUGB type vortex flow meter is a kind of velocity flow meter, which is widely used in petroleum, chemical, electric power, light industry, power heating industry. The production and implementation standards of our company's vortex flow meter are vortex flow sensor (JB/T9249-2015) and verification regulations for vortex flow meter (JJG10299-2007).

Operating Principle

The vortex flow meter is composed of a vortex generator, a detection probe and corresponding electronic circuits. When the fluid flows through the vortex generator, two alternating rows of vortices are formed on both sides of it. This vortex is called the Karman vortex street. On the basis of the Karman vortex street theory, Strohha proposed that the frequency of the Karman vortex street is proportional to the flow velocity of the fluid, and gives the relationship between frequency and flow velocity

$f = St \times V/d$

Formula:

f Vortex generation frequency (Hz)

V Average flow velocity on both sides of the vortex generator (m/s)

St Strohal coefficient (constant over a range of Reynolds numbers)

d Width of front face of vortex generator (m)

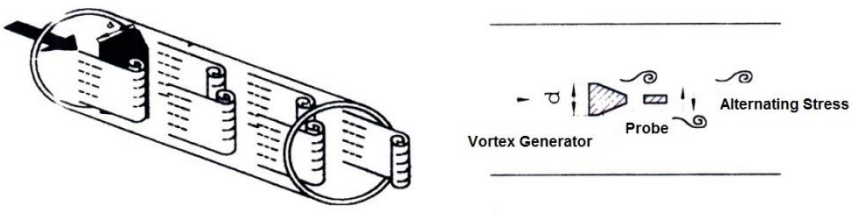


Figure 1 Vortex Flow Meter Working Principle Diagram

These alternating vortices form a series of alternating fluid lift forces. The lift force acts on the detection probe based on the piezoelectric effect to generate a series of alternating charge signals, which are converted, shaped and amplified by the preamplifier. Output a pulse signal with the same frequency as the vortex shedding and proportional to the flow velocity.

Instrument Features and Applications

Features:

1. No moving parts, long term stability, simple structure for easy installation and maintenance;
2. The output of sensor is pulse frequency, and its frequency is linear with the actual flow of the fluid being measured. Zero point has no drift and performance is very stable. The structure is diverse, including pipeline and plug-in flow sensors;
3. High accuracy, usually the measurement accuracy of liquid is ±1.0%; the measurement accuracy of gas is ±1.5%;
4. Wide measuring range, up to 1:20 within the Reynolds number of 2×104~7×106;
5. The pressure loss is small (about 1/4~1/2 of the orifice flow meter), which is an energy-saving flow meter;
6. The installation method is flexible, according to the different process pipelines on site, it can be installed horizontally, vertically and inclined at different angles;
7. It adopts noise cancellation circuit and anti-vibration sensor, which has certain anti-environmental vibration performance;
8. Using ultra-low power consumption single-chip microcomputer technology, one 3V10AH lithium battery can be used for more than 5 years;
9. Correction of non-linearity of instrument coefficients by software to improve measurement accuracy.
10. Use EEPROM to protect the accumulated flow from power failure, and the protection time is more than 10 years.

Application

The instrument can be widely used in large, medium and small pipeline water supply and drainage, industrial circulation, sewage treatment, oil and chemical reagents and compressed air, saturated and superheated

steam, natural gas and various medium flow measurements.

Technical Parameters

Table 1 Technical Parameters

Measured medium	Medium and high velocity media such as steam, compressed air, coal gas, liquid, etc.		
Implementation standards	Vortex flow sensor（JB/T9249-2015）		
Inspection procedures	Vortex flow meter（JJG10299-2007）		
Instrument size (mm) and connection type	Flange connection type	DN15-DN300	
	Clamp connection type	DN15-DN300	
Accuracy	Liquid measurement： ±1% Gas or vapor measurement：±1%、±1.5%		
Range ability	1:10；1:15；1：20		
Sensor material	SS304, SS316 etc		
Working condition	Medium temperature: -40 ~ +70℃ ； -40 ~ +250℃ ； -40 ~ +350℃ Ambient temperature: -20 ~ +60℃ Relative humidity: 5% ~ 90% Atmospheric pressure: 86 ~ 106kPa		
Output signal	Pulse signal, 4 ~ 20mA signal		
Communication output function	RS485 communication, HART protocol		
Power supply	External power supply: +24VDC±15%, ripple ≤±15%, suitable for 4-20mA output, pulse output, RS485, etc. Internal power supply: 1 set of 3.0V10AH lithium battery, the battery voltage can work normally at 2.0V~3.0V.		
Flange standard	Normal standard		GB/T 9113-2000
Flange standard	Other standard	International standard	For example: DIN, ANSI, JIS
Flange standard		China standard	For example: HG, JB
Signal line interface	M20×1.5 female thread（NPT thread needs to be customized）		
Explosion-proof	ExdIICT6 Gb		
Ingress protection	IP65 or higher（can be customized）		

Model Selection Table

1. Flow ranges for General Liquids and Gases (see table 2)

Table 2 Flow ranges for general gases and liquids

Instrument size (mm)	Liquid measurement range (m3/h)	Gas measurement range (m3/h)	Connection type	Pressure rating
15	1.2~6.2	5~25	Flange clamping/flange connection	2.5/1.6
20	1.5~10	8~50	Flange clamping/flange connection	2.5/1.6
25	1.6~16	10~70	Flange clamping/flange connection	2.5/1.6
32	1.9~19	15~150	Flange clamping/flange connection	2.5/1.6
40	2.5~26	22~220	Flange clamping/flange connection	2.5/1.6
50	3.5~38	36~320	Flange clamping/flange connection	2.5/1.6
65	6.2~65	50~480	Flange clamping/flange connection	1.6/1.6
80	10~100	70~640	Flange clamping/flange connection	1.6/1.6
100	15~150	130~1100	Flange clamping/flange connection	1.6/1.6
125	25~250	200~1700	Flange clamping/flange connection	1.6/1.6
150	36~380	280~2240	Flange clamping/flange connection	1.6/1.6
200	62~650	580~4960	Flange clamping/flange connection	1.6/1.6
250	140~1400	970~8000	Flange clamping/flange connection	1.6/1.6
300	200~2000	1380~11000	Flange clamping/flange connection	1.6/1.6

2. Volumetric flow rate for known standard conditions converted to operating conditions

The unit of measurement for common gases is the standard state volume unit of measurement, i.e. standard cubic meters per hour (Nm3/h), referred to as "standard side". The standard state volume flow rate is converted to the operating state volume flow rate by the following formula, i.e. cubic meter/hour (m3/h), and then compared with the applicable flow range in Table 2

$$Q_{(w)} = Q_{(s)} \times \frac{0.10325 \times (T_{(w)} + 273.15)}{293.15 \times (P_{(w)} + 0.101325)}$$

Formula:
Q(w): The volume flow of the measured medium under working conditions. (M3/h)
Q(s): The volume flow of the measured medium under standard conditions. (Nm3/h, 20℃, 0.1013MPa absolute pressure)
T 工: The temperature of the medium under the working condition
P 工: The pressure of the medium under the working condition, gauge pressure. (MPa)

3. For saturated steam, it can be selected according to the mass flow range given in Table.

4. For superheated steam, first check the density value of the corresponding temperature and pressure (take absolute pressure: gauge pressure + 1) against the superheated steam table (table 4), and then calculate the corresponding value according to the given mass flow through the following formula The volume flow rate is compared with the steam flow rate of the corresponding caliber (Table 2)

$$\mathbf{Q(m^3/h) = \frac{G(kg/h)}{\rho(kg/m^3)}}$$

Formula: G: Mass flow ρ: Medium density

(Unit: kg/h)

Table 3: Flow range of saturated steam

Absolute pressure Mpa		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3
Temperature ℃		120	133	144	152	159	165	170	175	180	184	189	192
Density Kg/m3		1.13	1.65	2.16	2.67	3.17	3.67	4.16	4.65	5.15	5.64	6.13	6.61
DN15	Qmin	6	8	11	13	16	18	21	23	26	28	31	33
	Qmax	28	41	54	67	79	92	104	116	129	141	153	165
DN20	Qmin	9	13	17	21	25	29	33	37	41	45	49	53
	Qmax	57	83	108	134	159	184	208	233	258	282	307	331
DN25	Qmin	11	17	22	27	32	37	42	47	52	56	61	66
	Qmax	79	116	151	187	222	257	291	326	361	395	429	463
DN32	Qmin	17	25	32	40	48	55	62	70	77	85	92	99

	Qmax	170	248	324	401	476	551	624	698	773	846	920	992
DN40	Qmin	25	36	48	59	70	81	92	102	113	124	135	145
	Qmax	249	363	475	587	697	807	915	1023	1133	1241	1349	1454
DN50	Qmin	41	59	78	96	114	132	150	167	185	203	221	238
	Qmax	362	528	691	854	1014	1174	1331	1488	1648	1805	1962	2115
DN65	Qmin	57	83	108	134	159	184	208	233	258	282	307	331
	Qmax	542	792	1037	1282	1522	1762	1997	2232	2472	2707	2942	3173
DN80	Qmin	79	116	151	187	222	257	291	326	361	395	429	463
	Qmax	723	1056	1382	1709	2029	2349	2662	2976	3296	3610	3923	4230
DN100	Qmin	147	215	281	347	412	477	541	605	670	733	797	859
	Qmax	1243	1815	2376	2937	3487	4037	4576	5115	5665	6204	6743	7271
DN125	Qmin	226	330	432	534	634	734	832	930	1030	1128	1226	1322
	Qmax	1921	2805	3672	4539	5389	6239	7072	7905	8755	9588	10421	11237
DN150	Qmin	316	462	605	748	888	1028	1165	1302	1442	1579	1716	1851
	Qmax	2543	3713	4860	6008	7133	8258	9360	10463	11588	12690	13793	14873
DN200	Qmin	655	957	1253	1549	1839	2129	2413	2697	2987	3271	3555	3834
	Qmax	5605	8184	10714	13243	15723	18203	20634	23064	25544	27974	30405	32786
DN250	Qmin	1096	1601	2095	2590	3075	3560	4035	4511	4996	5471	5946	6412
	Qmax	9040	13200	17280	21360	25360	29360	33280	37200	41200	45120	49040	52880
DN300	Qmin	1559	2277	2981	3685	4375	5065	5741	6417	7107	7783	8459	9122
	Qmax	12430	18150	23760	29370	34870	40370	45760	51150	56650	62040	67430	72710

（Unit: kg/h）

Table 3 Flow range of saturated steam

Absolute pressure Mpa		1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
Temperature ℃		195	198	201	204	207	209.8	212	214.8	217.2	219.5	221.8	223.9
Density Kg/m3		7.1	7.59	8.08	8.57	9.06	9.55	10.04	10.54	11.03	11.52	12.02	12.51
DN15	Qmin	36	38	40	43	45	48	50	53	55	58	60	63
	Qmax	178	190	202	214	227	239	250	263	275	288	300	313
DN20	Qmin	57	61	65	69	72	76	80	84	88	92	96	100
	Qmax	355	380	404	429	453	478	500	525	550	575	600	625
DN25	Qmin	71	76	81	86	91	96	100	105	110	115	120	125
	Qmax	497	531	566	600	634	669	700	735	770	805	840	875
DN32	Qmin	107	114	121	129	136	143	150	158	165	173	180	188
	Qmax	1065	1139	1212	1286	1359	1433	1500	1575	1650	1725	1800	1875
DN40	Qmin	156	167	178	189	199	210	220	231	242	253	264	275
	Qmax	1562	1670	1778	1885	1993	2101	2200	2310	2420	2530	2640	2750
DN50	Qmin	256	273	291	309	326	344	360	378	396	414	432	450
	Qmax	2272	2429	2586	2742	2899	3056	3200	3360	3520	3680	3840	4000
DN65	Qmin	355	380	404	429	453	478	500	525	550	575	600	625
	Qmax	3408	3643	3878	4114	4349	4584	4800	5040	5280	5520	5760	6000
DN80	Qmin	497	531	566	600	634	669	700	735	770	805	840	875
	Qmax	4544	4858	5171	5485	5798	6112	6400	6720	7040	7360	7680	8000
DN100	Qmin	923	987	1050	1114	1178	1242	1300	1365	1430	1495	1560	1625
	Qmax	7810	8349	8888	9427	9966	10505	11000	11550	12100	12650	13200	13750

DN125	Qmin	1420	1518	1616	1714	1812	1910	2000	2100	2200	2300	2400	2500
	Qmax	12070	12903	13736	14569	15402	16235	17000	17850	18700	19550	20400	21250
DN150	Qmin	1988	2125	2262	2400	2537	2674	2800	2940	3080	3220	3360	3500
	Qmax	15975	17078	18180	19283	20385	21488	22500	23625	24750	25875	27000	28125
DN200	Qmin	4118	4402	4686	4971	5255	5539	5800	6090	6380	6670	6960	7250
	Qmax	35216	37646	40077	42507	44938	47368	49600	52080	54560	57040	59520	62000
DN250	Qmin	6887	7362	7838	8313	8788	9264	9700	10185	10670	11155	11640	12125
	Qmax	56800	60720	64640	68560	72480	76400	80000	84000	88000	92000	96000	100000
DN300	Qmin	9798	10474	11150	11827	12503	13179	13800	14490	15180	15870	16560	17250
	Qmax	78100	83490	88880	94270	99660	105050	110000	115500	121000	126500	132000	137500

Table 4 Density of superheated steam

Temperature / Absolute Pressure (Mpa)	150	170	190	210	230	250	270	290	310	330	350	370
0.1	0.52	0.49	0.47	0.45	0.43	0.42	0.4	0.39	0.37	0.36	0.35	0.34
0.15	0.78	0.74	0.71	0.68	0.65	0.62	0.6	0.58	0.56	0.54	0.52	0.51
0.2	1.04	0.99	0.95	0.91	0.87	0.83	0.8	0.77	0.75	0.72	0.7	0.68
0.25	1.31	1.24	1.19	1.13	1.08	1.04	1	0.97	0.93	0.9	0.87	0.85

0.3	1.58	1.5	1.43	1.37	1.31	1.25	1.21	1.16	1.12	1.08	1.05	1.02
0.4	2.12	2.01	1.92	1.83	1.75	1.65	1.62	1.56	1.5	1.47	1.4	1.36
0.5	2.67	2.54	2.41	2.3	2.2	2.11	2.03	1.95	1.88	1.81	1.75	1.7
0.8	4.4	4.17	3.94	3.74	3.57	3.41	3.27	3.15	3.03	2.92	2.82	2.73
1.1	6.13	5.83	5.53	5.24	4.97	4.75	4.54	4.36	4.19	4.04	3.9	3.77
1.4	7.88	7.52	7.15	6.79	6.43	6.11	5.84	5.6	5.38	5.18	4.99	4.83
1.7	9.85	9.37	9.25	8.41	7.94	7.52	7.17	6.86	6.58	6.33	6.1	5.78
2	11.63	11.1	10.57	10.04	9.51	8.97	8.54	8.14	7.81	7.5	7.22	6.96
2.5	15.19	14.45	13.72	12.98	12.24	11.5	10.88	10.35	9.89	9.48	9.11	8.78
3	18.42	17.57	16.72	15.88	15.04	14.18	13.34	12.64	12	11.51	11.05	10.63
3.5	22.7	21.57	20.44	19.31	18.23	17.05	15.92	15.02	14.26	13.85	13.03	12.62

4	27.16	25.75	24.33	22.91	21.5	20.08	18.66	17.5	16.55	15.75	15.05	14.44
4.5	30.39	28.92	27.45	25.98	24.51	23.04	21.57	20.1	18.93	17.96	17.13	16.4
5	35.42	33.63	31.83	30.04	28.24	26.45	24.65	22.86	21.42	20.25	19.26	18.41
6	43.9	41.75	39.6	37.45	35.3	33.15	31.01	28.86	26.71	25.05	23.7	22.56

Table 4 Density of superheated steam

Temperature / Absolute Pressure (Mpa)	390	410	430	450	470	490	510	530	550	570	590
0.1	0.33	0.32	0.31	0.3	0.29	0.28	0.28	0.27	0.26	0.26	0.25
0.15	0.49	0.48	0.46	0.45	0.44	0.43	0.42	0.41	0.4	0.39	0.38
0.2	0.66	0.64	0.62	0.6	0.58	0.57	0.55	0.54	0.53	0.51	0.5
0.25	0.82	0.8	0.77	0.75	0.73	0.71	0.69	0.68	0.66	0.76	0.63
0.3	0.98	0.96	0.93	0.9	0.89	0.85	0.83	0.81	0.79	0.77	0.75
0.4	1.31	1.28	1.24	1.2	1.17	1.14	1.11	1.08	1.06	1.03	1.01
0.5	1.65	1.6	1.55	1.51	1.46	1.43	1.39	1.35	1.32	1.29	1.26
0.8	2.64	2.56	2.49	2.42	2.35	2.29	2.23	2.17	2.12	2.07	2.02
1.1	3.65	3.54	3.43	3.33	3.24	3.15	3.07	2.99	2.92	2.84	2.78
1.4	4.67	4.52	4.39	4.26	4.35	4.23	3.92	3.81	3.72	3.63	3.54
1.7	5.69	5.51	5.34	5.19	5.04	4.9	4.77	4.64	4.52	4.41	4.31
2	6.73	6.51	6.31	6.12	5.94	5.78	5.62	5.47	5.33	5.2	5.07
2.5	8.48	8.19	7.93	7.69	7.46	7.25	7.05	6.86	6.69	6.52	6.36
3	10.25	9.9	9.58	9.28	9	8.74	8.49	8.27	8.05	7.84	7.65
3.5	12.05	11.63	11.24	10.88	10.55	10.24	9.95	9.68	9.42	9.18	8.95
4	13.89	13.31	13	12.51	12.18	11.75	11.42	11.1	10.8	10.52	10.25
4.5	15.75	14.76	14.67	14.15	13.7	13.28	12.9	12.53	12.19	11.87	11.57
5	17.66	16.98	16.37	15.81	15.3	14.82	14.39	13.97	13.59	13.23	12.89
6	21.56	20.69	19.91	19.2	18.55	17.95	17.4	16.89	16.41	15.97	15.54

5. Calculation of pressure loss

Calculate whether the pressure loss has an impact on the process pipeline, calculated by the following formula:

$\Delta P=1.2\rho \cdot V2(Pa)$

In the formula: ΔP: Pressure loss(Pa)

ρ : Density

V: Average flow velocity in pipe (m/s)

6. When the medium to be measured is a liquid, to prevent cavitation and cavitation, the liquid pressure of the sensor shall be in accordance with the following formula:

$P \geqslant 2.6\Delta P + 1.25P1$ (Pa Absolute pressure)

In the formula: ΔP: Pressure loss value (Pa)

P1 : Vapor pressure of the fluid (Pa absolute pressure)

7. Model Selection Table (Table 5)

Table 5

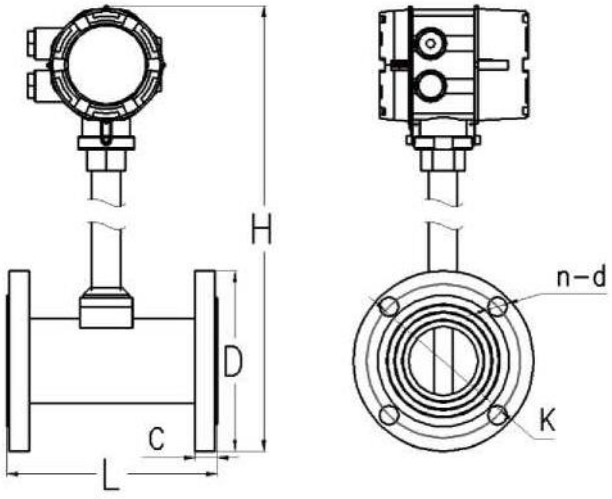
Model	Code							Content
LUGB-	□	/□	/□	/□	/□	/□	/□	
Connection Method	1							Flange connection
	2							Flange clamping
Probe Temperature		1						Low temperature probe（≤70℃）
		2						Medium temperature probe（≤250℃）
		3						High temperature probe（≤350℃）
Nominal Diameter			15					DN15
			20					DN20
			25					DN25
			32					DN32
			40					DN40
			50					DN50
			65					DN65
			80					DN80
			100					DN100
			125					DN125
			150					DN150
			200					DN200
			250					DN250
			300					DN300
Structure				Z				

	F				Split type
Instrument Type		N			No display, 24V/12V power supply, pulse output
		A			No display, 24V power supply, 4 ~ 20mA output
		V			Local display, external power supply, 4 ~ 20mA/RS485/pulse output
		D			Temperature and pressure compensation, external power supply, 4 ~ 20mA/RS485/Pulse output/HART
Accuracy			N		ExdIICT6 Gb
			E		Non explosion-proof
Pressure rating				N	Regular
				H (X)	High pressure (Negotiated)

Outline Drawing and Installation

Regular type / digital intelligent vortex flow meter

1. Flange connection type size



Regular Flange Connection Type Diagram

Table 6 flange connection type size comparison table

Instrument Size	L	D	K	H (mm)		d	n	Bolt Specifications	Standard Pressure Resistance
(mm)	(mm)	(mm)	(mm)	Pulse Output	Intelligent Type	(mm)	(Number of		

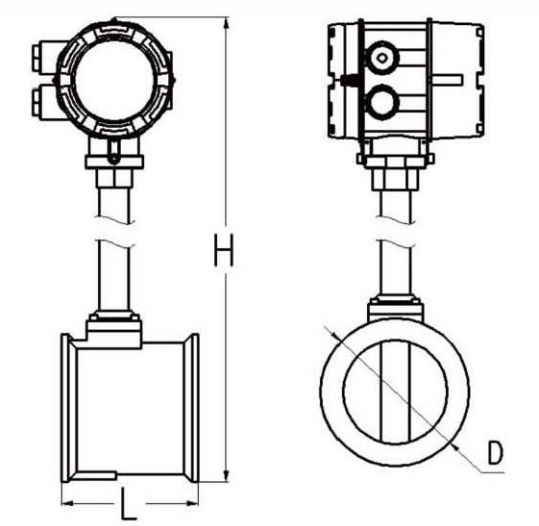
				Type			Holes)		
15	180	95	65	415	440	14	4	M12x60	Φ18x1.5
20	180	105	75	420	445	14	4	M12x60	Φ25x2.5
25	180	115	85	425	450	14	4	M12x60	Φ32x3.5
32	180	140	100	435	460	18	4	M16x70	Φ39x3.5
40	180	150	110	435	455	18	4	M16x70	Φ48x4
50	180	165	125	460	480	18	4	M16x70	Φ59x4.5
65	200	185	145	470	500	18	4	M16x70	Φ74x4.5
80	200	200	160	490	520	18	8	M16x70	Φ89x4.5
100	200	220	180	515	545	18	8	M16x70	Φ109x4.5
125	220	250	210	535	560	18	8	M16x70	Φ134x4.5
150	220	285	240	570	595	22	8	M16x90	Φ159x4.5
200	220	340	295	625	650	22	12	M16x90	Φ219x9
250	250	405	355	685	710	26	12	M24x110	Φ273x11
300	300	460	410	710	735	26	12	M24x110	Φ325x12

Note:

① The above parameters are applicable to flanged vortex flowmeter with pressure rating of 1.6 MPa.

② Flanged vortex flowmeters are not equipped with pipe flanges and bolts when they leave the factory. Users need to purchase them separately. The standard for connecting flanges is GB/TB9113-2000 raised panel flat-welded steel pipe flanges.

2. Clamping connection type size



Regular Clamping Connection Type Diagram

Table 7 Size comparison table of clamp connection type

Instrument Size (mm)	L	Lo*	D	H (mm)		Piping Specifications (Outer Diameter * Thickness)
	(mm)	(mm)	(mm)	Pulse Output	Digital	

				type	Intelligent Type	
15	65	105	66	405	425	Φ18x1.5
20	65	100	80	320	340	Φ25x2.5
25	65	100	80	320	340	Φ32x3.5
32	65	100	80	320	340	Φ39x3.5
40	65	100	80	320	340	Φ49x4.5
50	65	105	90	330	350	Φ59x4.5
65	65	105	105	330	350	Φ74x4.5
80	65	105	120	360	380	Φ89x4.5
100	65	110	140	380	400	Φ109x4.5
125	65	110	165	405	425	Φ134x4.5
150	65	115	190	430	450	Φ159x4.5
200	100	150	240	480	500	Φ219x9
250	150	200	290	520	550	Φ273x11
300	160	255	340	580	600	Φ325x12

Note:

① The above parameters are all applicable to flange clamping type vortex flowmeters with a pressure rating of 1.6MPa.

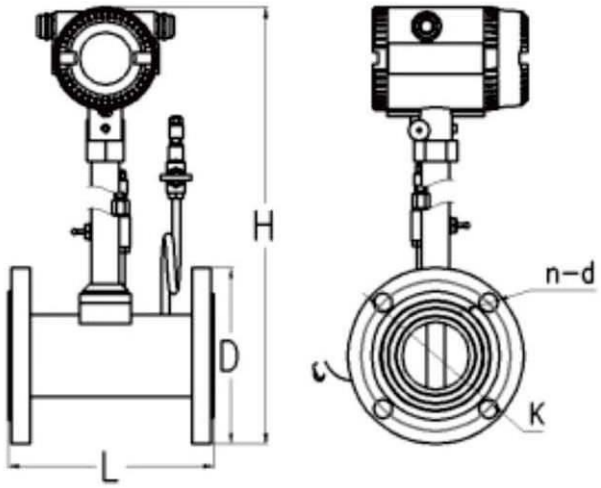
② Installation length L. Increase the length of the mating flange. The mounting flange is a special flange, which has been equipped before leaving the factory. The standard of the mounting flange is the corporate standard and is recommended.

③ The structure of pipe butt welding type, threaded connection type, clamp connection type, fixed plug-in type, ball valve plug-in type and the external dimensions of the high temperature type are subject to confirmation at the time of delivery or ordering.

④ Flowmeter installation flange adopts enterprise standard, or other national department or industry standard or other national standard (American standard, German standard, Japanese standard, etc.) if you need special standard, please specify at the time of ordering.

Temperature and pressure compensation type vortex flowmeter

3. Flange connection size



Temperature and Pressure Compensation Flange Connection Type Diagram

Table 8 flange connection type size comparison table

Instrument Size (mm)	L (mm)	D (mm)	K (mm)	H (mm)	d (mm)	n (Number of holes)	Bolt specifications	Piping Specifications (Outer diameter * thickness)
15	180	95	65	435	14	4	M12x60	Φ18x1.5
20	180	105	75	440	14	4	M12x60	Φ25x2.5
25	180	115	85	445	14	4	M12x60	Φ32x3.5
32	180	140	100	455	18	4	M16x70	Φ39x3.5
40	180	150	110	450	18	4	M16x70	Φ48x4
50	180	165	125	475	18	4	M16x70	Φ59x4.5
65	200	185	145	495	18	4	M16x70	Φ74x4.5
80	200	200	160	515	18	8	M16x70	Φ89x4.5
100	200	220	180	540	18	8	M16x70	Φ109x4.5
125	220	250	210	555	18	8	M16x70	Φ134x4.5
150	220	285	240	590	22	8	M16x90	Φ159x4.5
200	220	340	295	645	22	12	M16x90	Φ219x9
250	250	405	355	705	26	12	M24x110	Φ273x11
300	300	460	410	730	26	12	M24x110	Φ325x12

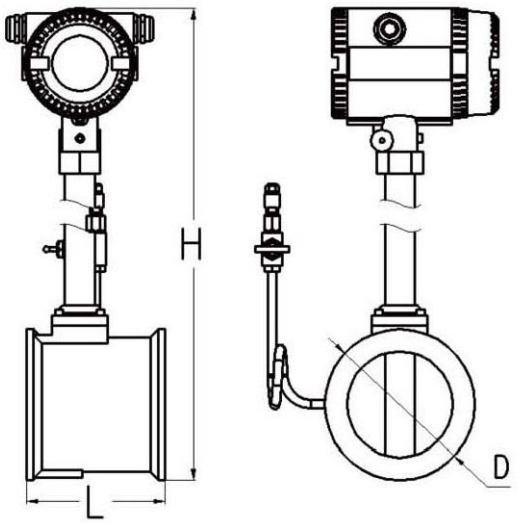
Note:

① The above parameters are applicable to flanged connection type vortex flowmeter with pressure rating of 1.6 MPa.

② Flanged vortex flowmeters are not equipped with pipe flanges and bolts when they leave the factory. Users need to purchase them separately. The standard for connecting flanges is GB/T9113-2000

raised-face flat-welded steel pipe flanges.

4. Clamping connection type size



Temperature and Pressure Compensation Clamp Connection Type Diagram

Table 9 Size comparison table of clamp connection type

Instrument Size (mm)	L (mm)	L (mm)	D (mm)	H (mm)	Piping specifications (outer diameter x thickness)
15	66	94	66	420	Φ18 x 1.5
20	66	94	66	420	Φ25 x 2.5
25	66	94	66	420	Φ32 x 3.5
32	66	94	66	420	Φ39 x 3.5
40	80	112	77	425	Φ49 x 4.5
50	80	120	89	430	Φ59 x 4.5
65	93	137	102	445	Φ74 x 4.5
80	100	144	113	455	Φ89 x 4.5
100	125	173	135	489	Φ109 x 4.5
125	145	197	158	515	Φ134 x 4.5
150	165	217	181	540	Φ159 x 4.5
200	196	252	248	595	Φ219 x 9
250	120	166	300	620	Φ273 x 11
300	135	185	350	670	Φ325 x 12

Note:

① The above parameters are all applicable to flange clamping vortex flowmeters with a pressure rating of 1.6MPa.

② Installation length L. Increase the length of the mating flange. The mounting flange is a special flange, which is already equipped at the factory. The standard of the mounting flange is the corporate standard, and it is recommended.

③ The above dimensions are for reference only when designing and selecting. The actual dimensions are subject to confirmation at the time of delivery or ordering.

④ Pipeline butt-welding type, threaded connection type, clamp connection type, fixed plug-in type, ball valve plug-in type structure and external dimensions, and high temperature type, temperature type external dimensions are subject to confirmation at the time of delivery or order.

⑤ The flowmeter mounting flange adopts corporate standards, and can also adopt other national department or industry standards according to user needs, or adopt other national standards (American Standard, German Standard, Japanese Standard, etc.). If you need special standards, please indicate when ordering.

5. Installation of flow meter and pipeline

Figure 1 Clamping Flange Type Installation

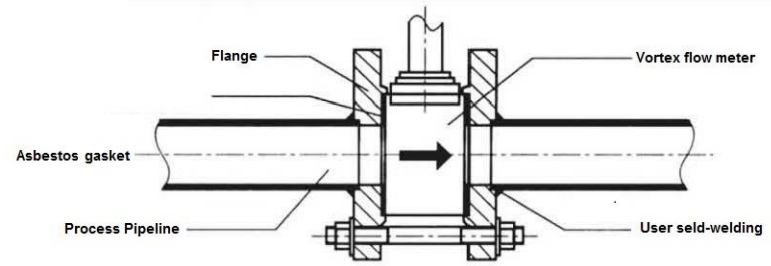


Figure 2 T-type Measuring Tube Installation

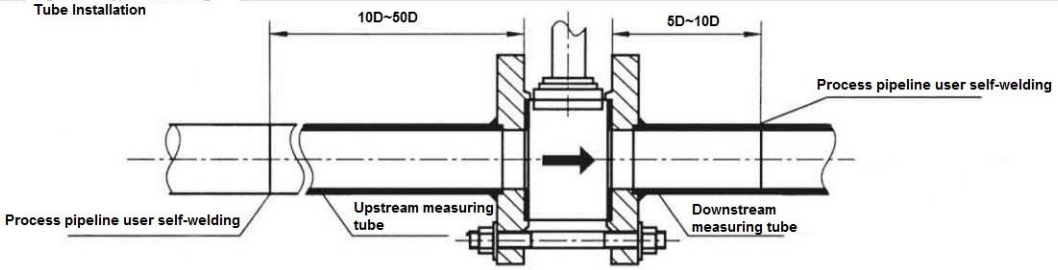


Figure 3 T-type Measuring Tube Installation

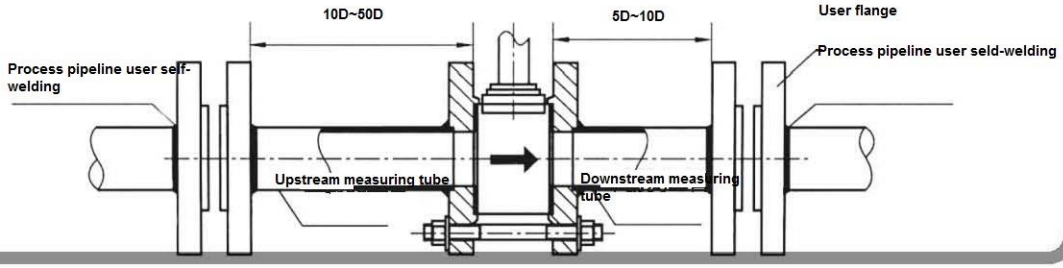


Figure 4 Pipe Diameter Reduced Type Installation

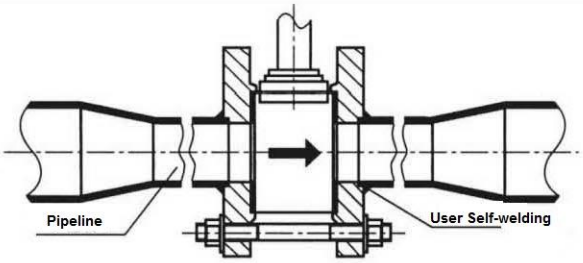
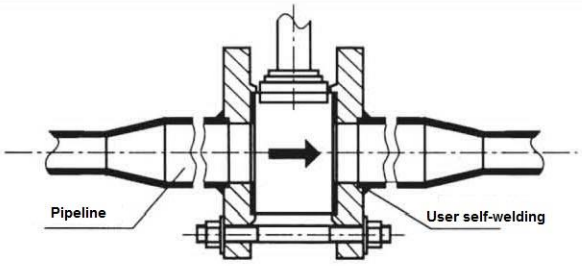
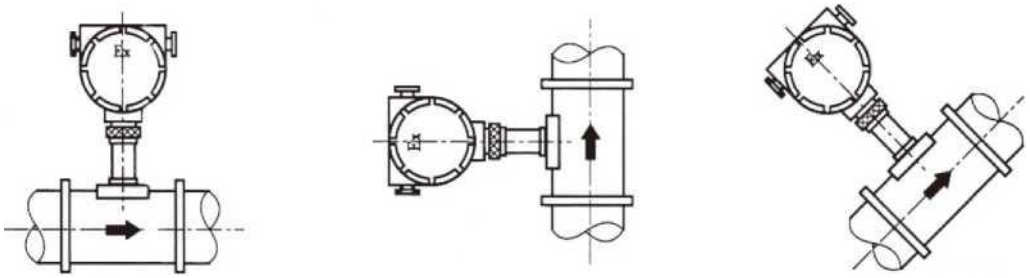


Figure 5 Pipe Diameter Expanded Type Installation



Installation Requirements

1. Flowmeter Installation



Horizontal Installation Vertical Installation Tilt Installation

Installation Diagram

① Make openings in the pipe as required by the opening size and position the openings to meet the requirements of the straight pipe section.

② Place the flanged flowmeter set into the open pipe.

③ Spot weld positioning of the flange and pipe.

④ Remove the flowmeter, weld the flange as required, and clean all protrusions in the pipe.

Install the sealing gasket with the same diameter as the pipeline in the inner groove of the flange, and install the flowmeter into the flange. The flow direction of the flowmeter should be the same as the direction of the fluid, and then tighten the bolts.

2. Installation Notes

① The flowmeter is best installed indoors. If it needs to be installed outdoors, measures should be taken to avoid direct sunlight and prevent rain.

② The flowmeter should be installed in places with strong magnetic interference, small space and inconvenient maintenance.

③ The flowmeter should not be installed in places with high temperature, heat radiation from equipment, or corrosive gas. If installation is required, heat insulation and ventilation measures must be taken.

④ The flowmeter should not be installed on the pipeline with mechanical vibration. If installation is necessary, shock absorption measures must be taken. A hose transition can be installed, or a fixed pipe support point and anti-vibration pad should be installed at the 2DN upstream and downstream of the flowmeter.

⑤ The flowmeter should be removed after the flange and pipe spot welding position, and the flowmeter

should not be welded with it.

⑥ Vortex flowmeter can measure liquid, gas and steam, but is not common between different media. The same medium is divided into three specifications: low temperature, high temperature and extra high temperature, and is not common between different temperatures.

⑦ When measuring liquids, it is important to ensure that the piping is filled with liquid so that the media flow direction is from the bottom up.

⑧ The flow meter can be installed at any 360 degree vertical direction along the pipe axis. Optimal installation: low-temperature dielectric rod installed vertically on the ground; high-temperature dielectric rod installed parallel to the ground.

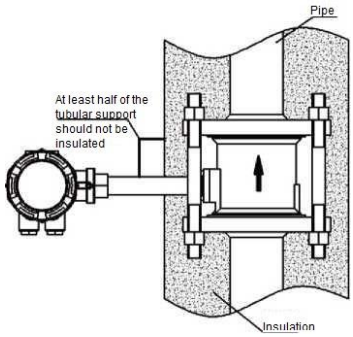
⑨ The flowmeter should be mounted on a long overhead pipe as far as possible, as the sagging pipe is likely to cause seal leakage between the flowmeter and the flange. If installation is necessary, pipe support points must be provided at 2D upstream and downstream of the meter.

⑩ In piping used to measure steam, the instrument connecting rod should be uninsulated at least halfway through to prevent excessive converter temperatures (as shown in Figure 7-2).

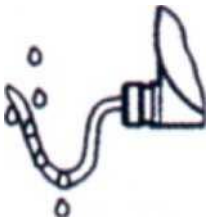
⑪ In order to facilitate observation and wiring, the meter head can be rotated 360 degrees in the original position, after adjusting the position, tighten the lock nut. To prevent moisture from entering the housing from the lock nut, the lock nut should be wrapped with waterproof tape to seal it if necessary.

⑫ The shielded cable connected to the flow meter should be routed away from strong electromagnetic field interference and should never be laid together with the high-voltage cable. The shielded cable should be as short as possible and not coiled to reduce the distribution inductance, and the maximum length should not exceed 500 m. The shielded cable should be as short as possible and not coiled to reduce the distribution inductance.

⑬ When wiring, first unscrew the case back cover and feed the signal wire through the waterproof connector. Follow the wiring diagram for proper wiring. Tighten the waterproof connector and ensure that the cable must be bent downward before entering the waterproof connector to ensure that water does not enter the housing through the cable (as shown below).



Correct Insulation Method

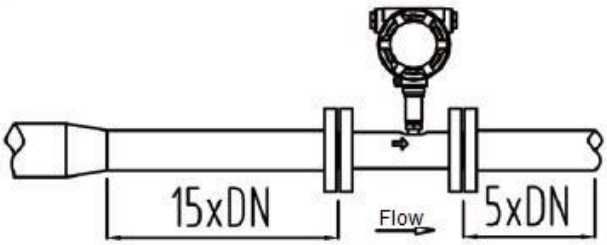


Waterproof wiring diagram

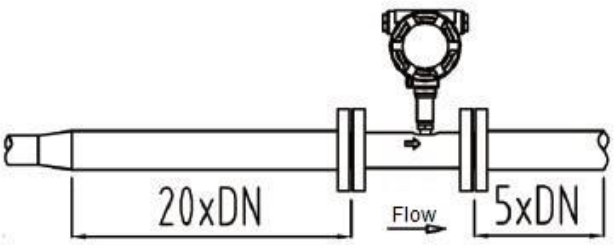
3. Requirements for Straight Pipe Sections

In order to ensure accurate measurement, the upstream of the flowmeter must have a sufficiently long straight pipe section, the upstream flow distribution is as undisturbed as possible, if there is a control and throttling device is best installed in the downstream. The minimum upstream and downstream requirements are as follows: upstream: 10DN (10 times the diameter); downstream: 5DN (5 times the diameter).

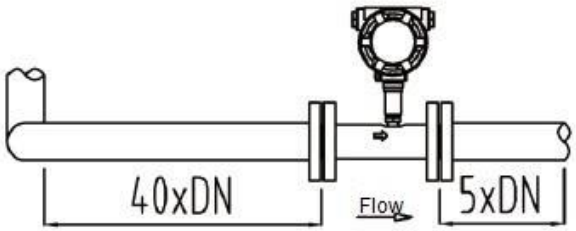
If there are elbows' shrinkage' expansion' valves, etc. upstream of the flowmeter, a longer straight section of pipe is required, as shown in Figure 7-4.



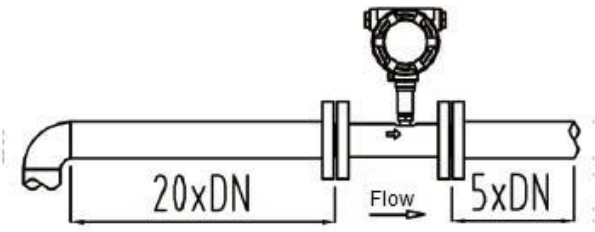
(1) Concentrically retracted fully open valve



(2) Concentric pipe expansion fully open valve



(3) Two 90° elbows in different planes



(4) One 90° elbow

Note: Requirements for piping: The inner diameter of the piping upstream and downstream of the installation point of the flowmeter shall be the same as the inner diameter of the flowmeter, which shall meet the requirements of the following formula.

0.98D < DN <1.05D

In the formula: D inside diameter of flowmeter; DN inside diameter of pipeline

The pipeline should be concentric with the flowmeter, coaxial deviation should not be greater than 0.05 DN.

Ordering Information

Please read this selection sample thoroughly and select the appropriate flowmeter for the fluid medium and field requirements, and then provide the following information to the manufacturer.

- Vortex flow meter models
- The name of the fluid medium and its physical parameters.
- Maximum working pressure, maximum working temperature, and minimum working temperature at which the fluid will operate.
- The common flow rate, maximum flow rate, and minimum flow rate of the fluid.