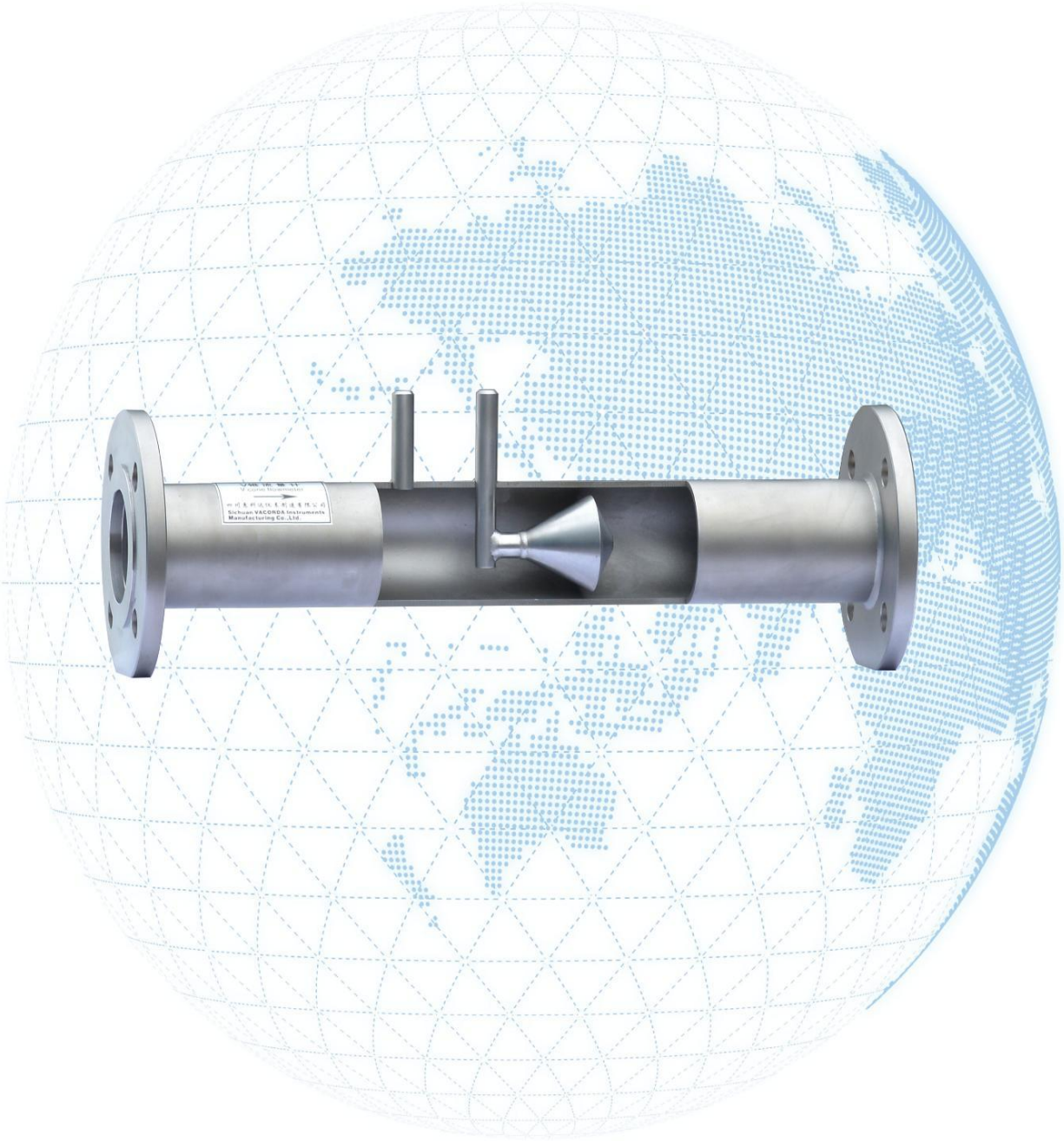
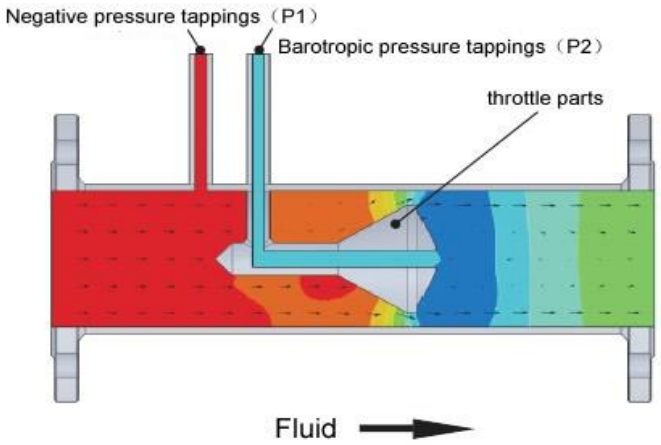
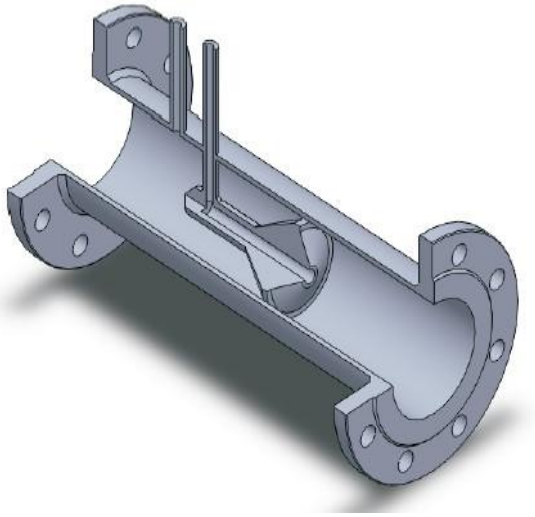
Product Manual | V-cone Flowmeter



Working Principle:

V-cone flow meter is a differential pressure type flow measurement device. So far it is more than 100 years since all kinds of flow measurement device that based on pressure differential theory been used. Pressure differential theory is based on energy conversion principle in sealed piping, means that to the steady liquid, flux and flow velocity's square root is direct ratio. We know that pressure will reduce when velocity increase, when medium approaches to cone the pressure is P1, but when medium is passing to cone's throttled area, because passing area reduced, speed increased, pressure reduced to P2, both P1 and P2 are connected to differential pressure transformer through pressure mouth. When flow rate is changed, the pressure differential value will increase or decrease accordingly.





Features:

1. Low installation requirement: Rectifying behavior changes the velocity distribution, eliminating the eddy current and blind space. upstream straight pipe 0-30D, downstream straight pipe 0-1D.
2. Turndown ratio : 10:1 (usually);50:1(maximum)
3. Small pressure loss and signal stability: V-cone differential pressure signal is high-frequency low-amplitude signals. When the same β value, the pressure loss is 1/3~1/5 of orifice plate's and signal fluctuation is 1/10 of orifice plate's.
4. Strong resistance against wear: After the streamline V cone is throttled, the vacuum effect will be generated on the surface of V cone to keep the V cone from being worn easily.
5. Automatic cleaning, no block, no adhesion: the complete purging design of V cone avoids the settlement of residue, coagulation or particle.

6. Long-standing favorable stability: the value of β can remain the same for long and the accurateness in measurement can be ensured for a long period.
7. High precision and good repeatability: accuracy:±0.5% F.S; repeatability:±0.1% F.S
8. Wide range of the value of β: the unique geometrical shape of V cone flow sensor allows wide range of the value of β.
9. Type specification complete, multi-choice of installation:pipeline, flange tapping, wafer and plug-in.
10. Wide range of nominal diameter: Φ15~Φ2000 (1/2"~120")or customize.
11. The ability to measure high temperature and high-pressure medium:maximum working temperature 700℃; maximum pressure 42MPa.
12. The ability to measure the dirty medium (coke-oven gas, blast furnace gas, feed stock and residual oil)
13. The ability to measure gas and liquid two-phase medium (moisture and condensed water)

Product classification and application:

1.classification:

A. for installation: Pipe welding, flange , wafer and plug-in.

B. for pressure measurement methods:pressure tap, face flange pressure tappings, plug-in male flange pressure tappings

C. for medium and condition:basic type, high temperature and pressure type, temperature and pressure compensation type, anti-corrosive type and anti-adhesion type.

2.Application:

Metallurgy, chemical industry, Chemical fiber industry, petroleum, nature gas, power supply, Hydraulic, mines, machinery, materials industry , city energy, environmental monitoring.

3.Conditions:

Nominal diameter: Φ 15~ Φ 2000, flow rate: ≥ 0.1m/s, working pressure:-0.1MPa~42MPa, working temperature:-160℃~700℃, environmental temperature≤85℃.

4.Applicate for many kinds of fluid:

Besides of normal gas ,liquid and steam,it also applicate for all kinds of gas,liquid and steam with high dust ,high suspended solids,high viscosity, strong corrosive,crystallize and supersaturated.

5.typical fluid:

gas		liquid	
Coal-gas:	coke oven gas, blast furnace gas, city gas	Oils:	crude oil, fuel oil,emulsified oil, diesel fuel
Nature gas:	≥5% moisture content nature gas	Water:	raw water, drinking water, polluted water
Hydrocarbon gas	alkanes, olefin	Various aqueous solutions	acid, lye, brine
Corrosive gases:	hydrogen, helium, argon, oxygen nitrogen	Organic chemicals:	methanol,glycol,xylene
Air:	hydrous air, dusty air, compressed air		
Flue gas:	boiler flue gas,furnace flue gas		
Steam		**Special fluid**	
Saturated steam		Oil +HC+sand	
Superheated steam		H20+CO2 etc.	

Technical parameters:

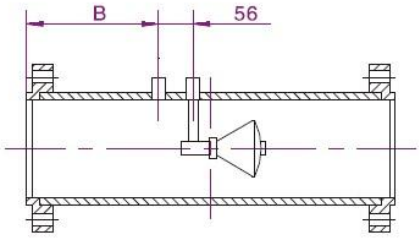
Accuracy class:	0.5
Long-term stability:	± 0.1% F.S / Y
Repeatability:	± 0.1%
Minimum flow velocity:	0.1m
Turndown ratio:	Normally15:1; max50:1
Reynolds number range:	8 × 103 ~ 5 × 106
Operating pressure:	≤ 16MPa, 42MPa(maximum)
Operating temperature:	-160 °C ~ 700 °C
Nominal diameter:	Φ15~ Φ2000 (1/2"~120")
Environment temperature:	≤ 80 °C
Relative humidity:	5 ~ 85%
Output signal:	4 ~ 20mA

Power supply:	24VDC
Voltage of DP transmitter :	24VDC
Current of DP transmitter :	4mA ~ 20mA
Voltage of intelligent flow totalizer:	220VDC
Current of intelligent flow totalizer:	4 ~ 20mA
Communications mode of DP transmitter:	HART&BRAIN
Communications mode of smart flow computation indicator:	RS232 & RS485

Common types:

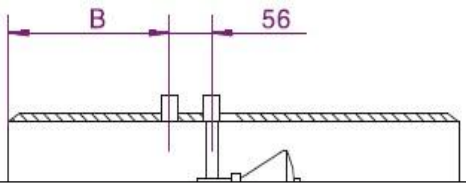
1.Flange type V-cone flowmeter:

Process connection:	flange
Nominal diameter:	1/2"~120" or customize
pressure measurement methods:	Socket welding,flange, thread
Operating pressure:	-0.1~42MPa
Operating temperature:	-100 °C ~ 700 °C
Material:	Metal, PP,PVC
Application:	Liquid, gas, steam.such as:blast furnace gas, coke oven gas, BOF gas, purging air, polluted water



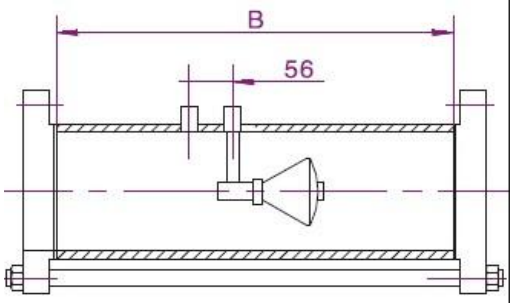
2.Pipe welding type V-cone flowmeter:

Process connection:	Pipe welding
Nominal diameter:	1/2"~120" or customize
pressure measurement	Socket welding,flange, thread

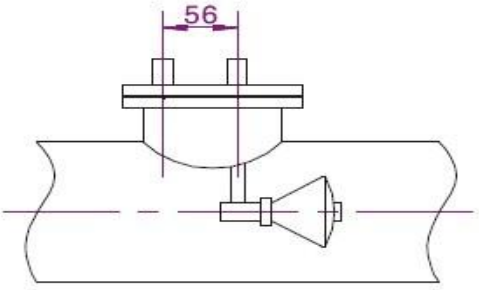


methods:		
Operating pressure:	-0.1~42MPa	
Operating temperature:	-100 °C ~ 700 °C	
Material:	Metal	
Application:	Liquid, gas, steam.such as:blast furnace gas, coke oven gas, BOF gas, purging air, polluted water,river water,	

3.wafer type V-cone flowmeter:

Process connection:	Flange clamps	
Nominal diameter:	1/2"~6"	
pressure measurement methods:	Socket welding, thread	
Operating pressure:	-0.1~42MPa	
Operating temperature:	-100 °C ~ 700 °C	
Material:	Metal	
Application:	Liquid, gas, steam etc.	

4.plug-in type V-cone flowmeter:

Process connection:	Flange, Openings welding	
Nominal diameter:	20"~120" or customize	
pressure measurement methods:	Socket welding, thread	
Operating pressure:	-0.1~42MPa	
Operating temperature:	-100 °C ~ 700 °C	
Material:	Metal	
Application:	Liquid, gas, steam etc.	

Model selection:

1. Process connection			
F:Flange	H:Pipe Welding	D: Wafer	C:Plug-in
2. Nominal diameter and Sealing surface			
E.g.:15/RF = DN15 RF sealing surface ; 300/M = DN300 M sealing surface			

3. Nominal Pressure (MPa)

A	B	C	D	E	F	G	H	J	K
1.0	2.5	4.0	5.0	6.3	10	16	26	32	42

4. Material of throttling part

R4	R1	R0	RL	Ti	X
SS304	1Cr18Ni9Ti(SS321)	SS316	SS316L	Titanium alloy	Customization

5. Material of Measuring tube

R0	R1	R4	RL
0Cr18Ni12Mo2Ti(316)	1Cr18Ni9Ti(321)	0Cr18Ni9(304)	00Cr17Ni14Mo2 (316L)

R2	R2F	R4F	HC	Ti
Carbon steel	Carbon steel + PTFE	304+PTFE	Hastelloy C alloys	Titanium alloy

6. Operating temperature (℃)

A	B	C	D	E	F	G	H
-160	100	200	300	400	500	600	700

7. DP transmitter configuration (Mpa)

0	1	2	3	4
N/A	Integrated Non-intelligence	Integrated intelligence	Segregated Non-intelligence	Segregated intelligence

8. Signal output of transmitter

0-without transmitter	1-4-20mA	2-4-20mA(HART)	3-RS485

9. Pressure tapping type

0-M20*1.5 female thread	1-1/2" female thread	3-flange

10. Pressure and temperature compensation

0	1	2	3
N/A	Pressure compensation	Temperature compensation	Pressure and temperature compensation

11. Explosion proof

N-N/A	i-Exia II CT6Ga	e-Exd II CT6Gb

12. Medium

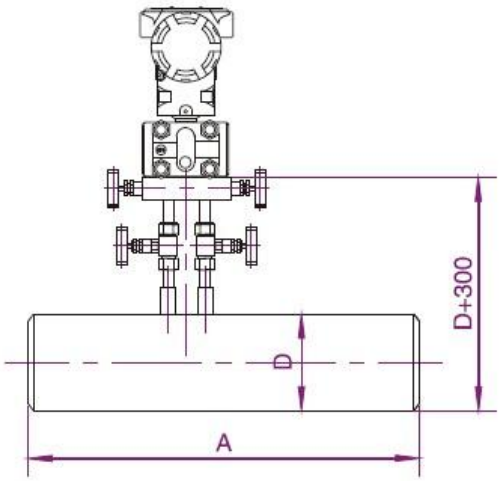
Y	Q	Z	R	C	W
Lliquid	Gas	Saturated steam	Superheated steam	Viscous liquid	Dirty water

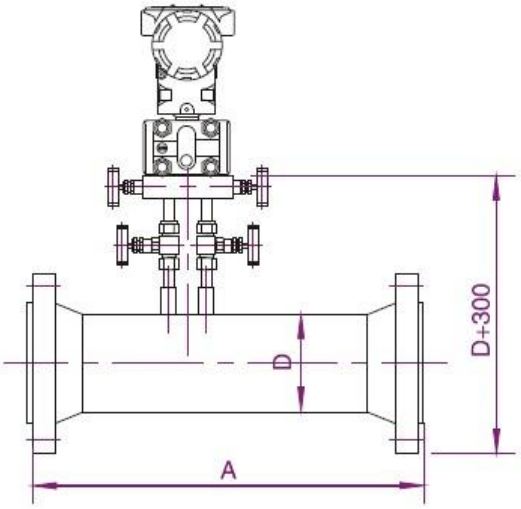
LGV- 1 2 3 4 5 6 7 8

Note:

1. **Pls note the pipe size: Nominal diameter, Outer diameter and wall thickness**
2. **For accessories, like 3-valve manifold, Root valve, Condenser, Matching flange**

Reference Dimension:





DN (mm)	Pressure Rate (MPa)													
	0.25	0.6	1.0	1.6	2.5	4.0	5.0	6.3	11	16	26	42	22	32
	A	A	A	A	A	A	A	A	A	A	A	A	A	A
15			300	300	300	300	300	300	330	330	330	360	330	330
20			300	300	300	300	300	300	330	330	330	360	330	330
25			300	300	300	300	300	300	330	330	330	380	330	330
40			360	360	360	360	400	400	400	400	440	500	440	500
50			400	400	400	400	450	450	450	500	500	560	440	500
65			420	420	420	420	490	490	490	580	580	620	580	620
80			500	500	500	500	500	500	550	650	650	720	650	650
100			550	550	550	550	550	550	630	630	630	800	630	630
125			700	700	700	700	800	800	800	980	980	1150	980	980
150			700	700	700	700	800	800	800	980	980	1150	980	980
200			800	800	800	800	900	900	950	1100	1100	1300	980	980
250			850	850	850	900	900	900	1050	1150	1250	1600	1250	1250
300			900	900	900	1000	1000	1000	1100	1200	1350	1700	1300	1300
350			900	900	900	900	1050	1050	1100	1200	1400			
400			900	950	1050	1050	1100	1100	1150	1350	1450			
450			1000	1100	1100	1200	1200	1200	1250	1500	1550			

500			1100	1150	1200	1270	1270	1270	1350	1600	1700			
600			1400	1400	1450	1500	1550	1600	1600	2000	2000			
700	1700	1700	1700	1700	1750	1800	1800	1800	1800					
800	1700	1700	1700	1700	1750	1850	1850	1850	1850					
900	1700	1700	1700	1700	1750	1850								
1000	1950	1950	1950	1950										
1200	1950	1950	1950	1950										
1400	2250	2250	2250	2250										
1600	2300	2300	2300											
1800	2600	2600	2600											
2000	3200	3200	3200											

Note: Error range of total length:

DN15~25:±4mm; DN40~250:±6mm; DN300~600:±7mm; ≥DN700:±8mm

DN＞600, flange standard is ANSI B16,47; HG20616-2009

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