



## GENERAL

Vortex flow sensing technology relies on measuring the number of vortex pulses generated by a bluff body immersed in the flow stream. The SMC Vortex meter uses dual sensor technology, producing two independent vortex signals which allows for signal amplification and common mode noise reduction. Our sensors never touch the process fluid; the crystal sensors are bonded behind a stainless steel wall. The electronics pick up the slightest pressure pulsations generated by the vortices through the stainless steel wall. This design allows meters to have an extremely wide turndown while maintaining an almost unlimited upper end and a high pressure rating. Our sensor is the thinnest wafer vortex on the market. The meter body bolt lengths are shorter to allow for better flange alignment and tighter, leak-free installations. Our insertion models are uniquely designed so as to prevent miss-alignment of the bluff body in the flow stream; a common problem with many other brands of insertion vortex meters on the market.

## FEATURES

- Suitable for a wide variety of applications with steam, gas, and liquid medias
- No moving parts and no leak paths; no o-ring or graph oil seals to wear, fail or leak
- Two independent sensors , allowing for better signal amplification and noise reduction
- Error messages displayed for or erratic flows and flows outside of calibrated ranges
- Field calibration possible with integral or remote electronics and keypad
- True 2-wire 4-20 mA interface
- Wide measuring range, turn-down ratio of 30:1
- Insertion meters can be installed vertically, horizontally or in angled pipelines
- Available and an integrated mass flow vortex
- Weather proof multi-pole connector for power, signal and serial interface
- ALVTIS (insertion) can be hot-tapped with ball valve and retractable assembly
- Area of measurement can be smaller than pipe connection for better rangeability



## SPECIFICATION

- Process Connection: wafer(standard), Flanged; Insertion;
- Process temperature: -5~+250°C (with LCD display)
- Operating pressure : 1.6MPa standard; up to 6.5 Mpa as options
- Velocity Range : Depends on fluid, pressure and temperature
- Liquids : 0.7~5 m/s
- Gas & Steam : 7~45 m/s
- Accuracy : 1.0% for liquid, 1.5% for gas
- Repeatability : 0.33% for liquid, 0.5% for gas
- Turn down ratio : 10:1
- Material : SS304
- Signal output : Pulse output, 2-wire 4~20mA<sub>DC</sub>, RS485, Hart, ModBus
- RAM Back-up : Lithium Battery, 3.6V<sub>DC</sub>
- Housing protection : IP65; IP67
- Ex Exid II B T4; Exib II C T 4
- Cable: 10 m free for remc
- weight (approximate) : Wafer :10 ~ 13kg to DN300  
Flange: Flange weight contact factory.  
Insertion: 5.5kg to DN500
- Signal Interface : RS232 & RS485, HART
- Display units : m<sup>3</sup>/h
- Keypad : Rate, Total
- Power supply : 110/220 V<sub>AC</sub> or isolated 14~36 V<sub>DC</sub>
- NIST traceable : No
- Data storage : EPROM storage up to 5 years
- Data logger : Reading, sampling Times 0.5 S

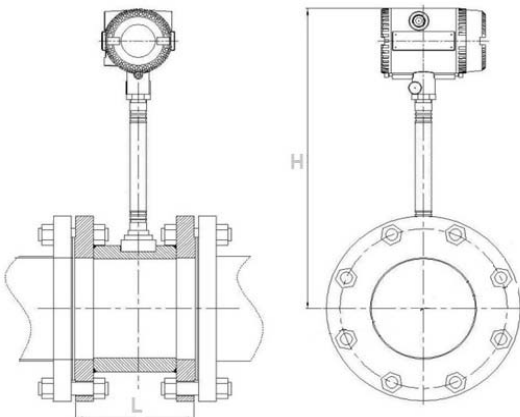
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**ALVT**

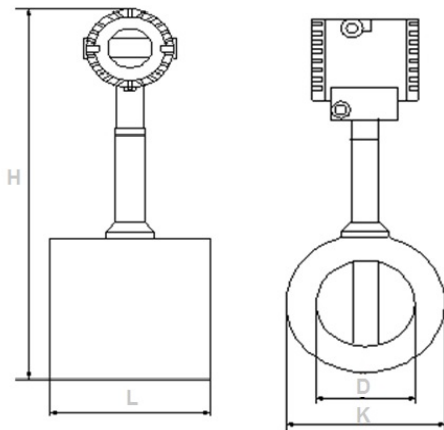
Dimension in mm

**Flange**



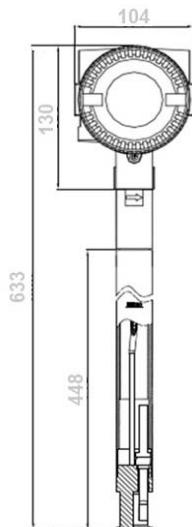
DN	L ± 3		H ± 3		Weight (kg)	
	class	class	class	class	class	class
	150#	300#	150#	300#	150#	300#
25	180	180	352	359.5	4.68	5.68
32			369	379	5.42	6.82
40			376	391	5.97	8.36
50	200	200	388	395.5	7.58	8.84
65			405	410	10.4	11.96
80			425	435	12.39	15.75
100	220	220	445	457.5	17.24	23.89
125			469	481.5	19.29	30.63
150			502	522	24.82	39.91
200			562	579.5	35.73	58.79
250	250	250	612	632	51.93	85.16
300	300	300	677	694.5	76.1	122.4

**Wafer**



DN	L ± 3	D ± 3	K ± 3	H ± 3	Weight
15	65	75	130	331	4.01kg
20				328.5	3.90kg
25				326	3.76kg
32	70	80	145	332.8	4.11kg
40		84		337.8	4.35kg
50	75	94	160	348	4.77kg
65		105	180	361	5.09kg
80	84	120	192	376	6.19kg
100	90	140	230	397	7.61kg
125	100	165	242	423	9.89kg
150	120	190	280	448	13.44kg
200	150	240	335	501	21.89kg
250	160	290	405	549	30.51kg
300	170	340	460	599	40.85kg

**Insertion**



DN	L ± 3	H ± 3	Weight
80-500	104	633	5.5 kg

## Mass flow of saturated steam (t/h)

ID(mm)	0.2MPa		0.4MPa		0.6MPa		0.8MPa		1.0MPa		1.2MPa		1.4MPa		1.6MPa	
15	7.0-46.4Kg/h		8.8-75.0Kg/h		10.4-103.0Kg/h		11.6-130.7Kg/h		12.8-158.3Kg/h		13.7-185.8Kg/h		14.9-213.2Kg/h		15.8-240.6Kg/h	
20	12.8-82.5Kg/h		16.2-133.3Kg/h		19.1-183.1Kg/h		21.5-232.4Kg/h		23.8-281.4Kg/h		26.1-330.3Kg/h		28.2-379.1Kg/h		30.4-427.8Kg/h	
25	16.2-128.8Kg/h		20.5-208.2Kg/h		24.1-286.1Kg/h		27.1-363.1Kg/h		30.0-439.6Kg/h		32.4-516.1Kg/h		34.8-592.3Kg/h		37.2-668.4Kg/h	
32	26.3-211.1Kg/h		33.3-341.2Kg/h		39.2-468.8Kg/h		44.4-594.9Kg/h		38.0-720.3Kg/h		0.05	0.85	0.05	0.97	0.06	1.10
40	32.0-329.8Kg/h		40.6-533.1Kg/h		47.7-732.5Kg/h		0.05	0.93	0.06	1.13	0.06	1.32	0.06	1.52	0.07	1.71
50	0.04	0.52	0.06	0.83	0.07	1.14	0.09	1.45	0.10	1.76	0.11	2.06	0.12	2.37	0.13	2.67
65	0.08	0.87	0.10	1.41	0.12	1.93	0.14	2.45	0.15	2.97	0.15	3.49	0.16	4.00	0.18	4.52
80	0.12	1.32	0.14	2.13	0.16	2.93	0.18	3.72	0.20	4.50	0.22	5.28	0.24	6.07	0.26	6.84
100	0.18	2.06	0.23	3.33	0.27	4.58	0.30	5.81	0.33	7.00	0.36	8.26	0.39	9.48	0.41	10.69
125	0.31	3.22	0.41	5.21	0.51	7.15	0.61	9.08	0.72	11.00	0.85	12.90	0.97	14.81	1.07	16.71
150	0.40	4.46	0.51	7.50	0.60	10.30	0.71	13.07	0.84	15.83	1.08	18.58	1.25	21.32	1.39	24.06
200	0.84	8.25	1.06	13.33	1.25	18.31	1.42	23.24	1.64	28.14	1.87	33.03	2.13	37.91	2.39	42.78
250	1.51	12.88	1.92	20.82	2.26	28.61	2.54	36.31	2.84	44.00	3.23	51.61	3.51	59.23	3.79	66.84
300	2.17	18.55	2.76	29.99	3.23	41.20	3.64	52.28	4.01	63.30	4.49	74.31	4.98	85.29	5.46	96.25
350	2.95	25.25	3.75	40.82	4.39	56.08	4.95	71.16	5.45	86.16	6.11	101.20	6.78	116.10	7.39	131.00
400	3.86	32.98	3.66	53.31	5.73	73.25	6.46	92.95	7.12	112.50	7.98	132.10	8.85	151.60	9.65	171.10
450	4.87	41.74	6.18	67.47	7.25	92.71	8.17	117.60	9.01	142.40	10.00	167.20	11.20	191.90	12.20	216.60
500	6.01	51.50	7.62	83.30	8.95	114.50	10.00	145.20	11.12	175.80	12.30	206.40	13.90	236.90	15.06	267.40

Note: The pressure in table is gauge pressure

## Mass flow of superheat steam (t/h)

ID (mm)	min flow	max flow
15	$5.4\sqrt{\rho}$ Kg/h	$28.61 \rho$ Kg/h
20	$9.88\sqrt{\rho}$ Kg/h	$50.87 \rho$ Kg/h
25	$12.49\sqrt{\rho}$ Kg/h	$79.48 \rho$ Kg/h
32	$20.35\sqrt{\rho}$ Kg/h	$130.22 \rho$ Kg/h
40	$24.88\sqrt{\rho}$ Kg/h	$203.47 \rho$ Kg/h
50	$37.1\sqrt{\rho}$ Kg/h	$317.93 \rho$ Kg/h
65	$65.67\sqrt{\rho}$ Kg/h	$537.29 \rho$ Kg/h
80	$99.66\sqrt{\rho}$ Kg/h	$813.89 \rho$ Kg/h
100	$0.14\sqrt{\rho}$	$1.27 \rho$
125	$0.22\sqrt{\rho}$	$2.00 \rho$
150	$0.31\sqrt{\rho}$	$2.86 \rho$
200	$0.65\sqrt{\rho}$	$5.07 \rho$
250	$1.05\sqrt{\rho}$	$7.95 \rho$
300	$1.35\sqrt{\rho}$	$11.45 \rho$
350	$1.84\sqrt{\rho}$	$15.58 \rho$
400	$2.4\sqrt{\rho}$	$20.35 \rho$
450	$3.04\sqrt{\rho}$	$25.75 \rho$
500	$3.77\sqrt{\rho}$	$31.79 \rho$

Note:  $\rho$ ----density of the superheat steam under operating condition (Kg/m<sup>3</sup>)

Volumetric flow of gas (Nm<sup>3</sup>/min)

ID (mm)	min flow	max flow
15	$0.088k / \sqrt{\rho}$	0.48k
20	$0.156k / \sqrt{\rho}$	0.85k
25	$0.201k / \sqrt{\rho}$	1.32k
32	$0.328k / \sqrt{\rho}$	2.17k
40	$0.397k / \sqrt{\rho}$	3.4k
50	$0.658k / \sqrt{\rho}$	5.3k
65	$0.995k / \sqrt{\rho}$	8.95k
80	$1.51k / \sqrt{\rho}$	13.56k
100	$2.36k / \sqrt{\rho}$	21.2k
125	$3.68k / \sqrt{\rho}$	33.12k
150	$5.27k / \sqrt{\rho}$	47.7k
200	$9.42k / \sqrt{\rho}$	84.8k
250	$14.73k / \sqrt{\rho}$	132.5k
300	$21.20k / \sqrt{\rho}$	190.8k
350	$28.86k / \sqrt{\rho}$	259.6k
400	$37.7k / \sqrt{\rho}$	339.1k
450	$47.71 / \sqrt{\rho}$	429k
500	$58.9k / \sqrt{\rho}$	529.9k

Note:1.  $\rho$ ---- density of gas under operating condition (Kg/m<sup>3</sup>)

2. Standard condition 20°C, 0.1MPa (absolute pressure), or under atmosphere at 20°C

$$3. k = \frac{P+0.101325}{0.101325} \times \frac{293.15}{t+273.15}$$

P: working pressure in Mpa

t: fluid temperature in deg C

Volumetric flow of liquid (m<sup>3</sup>/h)

ID (mm)	min flow	max flow
15	$12.01 / \sqrt{\rho}$	3.21
20	$21.18 / \sqrt{\rho}$	5.65
25	$33.2 / \sqrt{\rho}$	8.83
32	$106.6 / \sqrt{\rho}$	14.47
40	$133.7 / \sqrt{\rho}$	22.61
50	$167.0 / \sqrt{\rho}$	35.33
65	$226.4 / \sqrt{\rho}$	59.70
80	$343.1 / \sqrt{\rho}$	90.43
100	$536.0 / \sqrt{\rho}$	141.30
125	$837.7 / \sqrt{\rho}$	220.80
150	$1206.4 / \sqrt{\rho}$	317.90
200	$2144.8 / \sqrt{\rho}$	565.20
250	$3351.3 / \sqrt{\rho}$	883.10
300	$4825.9 / \sqrt{\rho}$	1271.70
350	$6568.5 / \sqrt{\rho}$	1730.93
400	$8576.7 / \sqrt{\rho}$	2260.80
450	$10856.8 / \sqrt{\rho}$	2861.30
500	$13405.8 / \sqrt{\rho}$	3532.50

Note: 1.  $\rho$ ----density of liquid under operating condition (Kg/m<sup>3</sup>)

2. Density of water under normal temperature and pressure is 1000Kg/m<sup>3</sup>,

$$3. \sqrt{\rho} = 31.623 \text{ Kg/m}^3$$

**\*\* Please contact your local SmartMeasurement application engineer**

**You also need to provide the following information:**

Type of Fluid (liquid/gas or steam)	Please provide the name of your fluid, including operating density and viscosity
Full Scale Flow	Maximum and minimum flow rates, units must be Kg/hr, Lb/hr, LPM or GPM
Line Size	Please specify your pipe size as well connection type (flange, threaded)
Process Pressure and Temperature	We will calibrate your meter as close to your operating conditions as possible
Type of Electronics	Please indicate if you want integral or remote electronics
Power Requirements	Please specify your power requirements such as 24 V <sub>DC</sub> or 115 V <sub>AC</sub> or 230 V <sub>AC</sub>

## ➤ Model Selection Guide

ALVT meters														
Example:ALVT-2-3-40-D-1-2-0-N-1-NNN														
ALVT-	**	**	_ **	**	_ **	**	**	_ **	**	**	**	**	Description	
Flanged	1											Style		
Wafer	2													
Insertion- fixed	3													
Insertion- with ball valve	4													
Liquid	2												Fluid	
Gas	3													
Steam	4													
Inline type DN15~DN300			**											Line Size
Insertion pipe size, up to 16 bar and 120 C			**											
Integral with digital display - standard				D										Display
Remote with 5m cable				R										
13.5~45 VDC - Standard				1										Power Supply
3.6V lithium battery -no output				2										
No output				0										Signal Output
Pulse output				1										
Two wire 4-20mA DC output				2										
No communication				0										Communication
RS-485 Communication without 4-20mA				3										
Hart Communication @ 4-20mA				5										
Standard -40~482 °F (-40 ~ 250 °C)				N										Temperature
High Temp 382~660 °F (250 ~350 °C)				H										
232 psi (1.6MPa)				1										Pressure
363 psi (2.5MPa)				2										
580 psi (4.0MPa)				3										
928 (6.4MPa)				4										
None				N										Explosion Proof
Explosive Isolated				G										
Intrinsically safe				B										
Intrinsically safety				B										
Standard material - 304SS				NN										Options
Special material - 316SS				316										
Mass flow without PT100 and pressure transmitter				MS										
Mass flow with PT100 and pressure transmitter				MT										
Flow computer - 24 VDC power, 4-20mA output, LED display				FC										