



GENERAL

Vortex sensing technology involves, measuring the number of vortex pulses generated by a bluff body induced in the flow stream. The Alia Vortex meters uses dual sensor technology producing two independent vortex signals which allows for the signal amplification and common mode noise reduction. Our sensors never touch the process fluid. Our crystal sensors are bonded behind a stainless steel wall. The electronics pick up the slightest pressure pulsations through the stainless steel wall generated by the vortices. This design allows meters to have an extremely wide down while maintaining an almost unlimited upper end with a high pressure rating. Our model is the thinnest wafer vortex in the market. The meter body the bolt lengths are shorter which allows for a better alignment of flanges 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, which are common with all insertion vortex meters in the market.



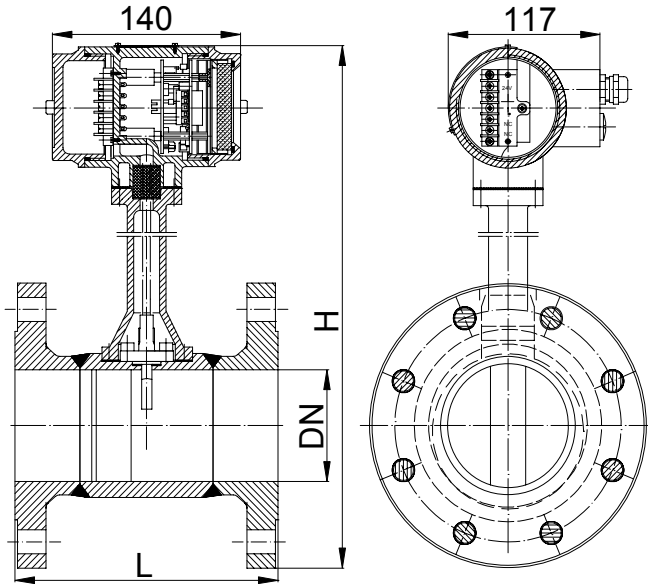
FEATURES

- No moving parts, high reliability and durability
- Convenient install and maintenance
- Sensor not contacts with the measured fluids directly, stable performance and long term life
- Output pulse signal is proportional to flow rate, high accuracy and no zero drift
- Wide measuring range, rate of turn-down 1:20
- Low pressure loss, low cost
- Frequency output not affected by the fluid change in physical character and composition, meter factor (K) is only considered with shape and dimensions of the bluff body, not need compensation for volume flowrate, not re-calibration meter factor needed if damaged parts be exchanged
- Wide application for steam, gas, liquid
- NIST traceable calibration certificate

SPECIFICATION

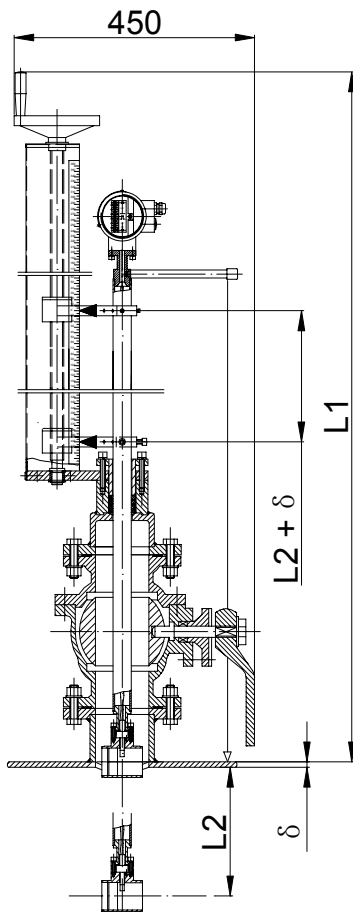
- Process Connection : flanged(standard),Insertion(fixed and adjustable)
type, Wafer style
- Process temperature : -35°C~+ 350°C (without LCD display)
-5°C~+250°C (with LCD display)
- Operating pressure : 1.6MPa (2.5-6.4MPa for special order)
- Velocity Range : Depends on fluid, pressure and temperature
- Liquids : ≤0~12m/s
- Gas & Steam : ≤3.5m/s(gas) ≤70m/s
- Accuracy : 1.0% for liquid, 1.5% for gas, 2.5% for insertion type
- Repeatability : 0.33% for liquid, 0.5% for gas, 0.83% for insertion
- Turn down ratio : 1:10
- Material : SS304 (housing) , CS (standaed flang)
- Signal output : Puls output, Two wire with 4~20mADC, RS485, Hart, ModBus
- RAM Back-up : Lithium Battery, 3.6VDC
- Housing protection : IP65; IP67; IP68
- Ex-protection : Exid II B T4; Exib II C T 4
- Cable: 10 meters free for remote version
- weight (approximate) :
Wafer : 10 kg~ 13kg (to DN300)
Insertion: 15 Kg
- Notes:-Flange weight contact factory.
- Signal Interface : RS232 & RS485, HART
- Display units : m3/h
- Keypad : Rate, Total
- Power supply : 110/220 VAC or isolated 14~36 VDC
- NIST traceable : No
- Data storage : EPROM storage up to 5 years
- Data logger : Reading, sampling Times 0.5 S

Wafer



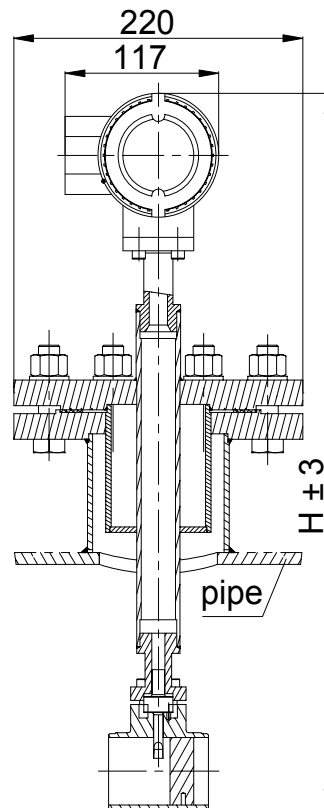
| DN | L ± 3 | | | H ± 3 | | | Weight |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| | class 150 | class 300 | class 600 | class 150 | class 300 | class 600 | |
| 25 | 150 | 190 | 220 | 402 | 410 | 410 | 10.3 kg |
| 32 | | 200 | 230 | 410 | 417 | 417 | 11.0 kg |
| 40 | | 200 | 240 | 420 | 430 | 430 | 14.4 kg |
| 50 | 170 | 210 | 250 | 430 | 435 | 435 | 16.5 kg |
| 65 | 190 | 220 | 270 | 450 | 455 | 455 | 19.0 kg |
| 80 | 200 | 220 | 270 | 460 | 470 | 470 | 23.3 kg |
| 100 | 220 | 250 | 320 | 490 | 515 | 512 | 29.3 kg |
| 125 | 240 | 275 | 360 | 515 | 542 | 554 | 30.3 kg |
| 150 | 270 | 310 | 390 | 542 | 590 | 580 | 56.0 kg |
| 200 | 310 | 335 | 450 | 600 | 620 | 640 | 75.5 kg |
| 250 | 370 | 390 | 510 | 657 | 640 | 710 | 109 kg |
| 300 | 400 | 430 | 550 | 723 | 690 | 760 | 131 kg |

Insertion - with ball valve



| DN | L1 ± 3 | L2 | Weight |
|----------|--------|---------|--------|
| 250~700 | 1570 | 0.5 d | 18 kg |
| 800~1800 | 1570 | 0.121 d | 36 kg |

Insertion - fixed



| DN | H ± 3 | Weight |
|----------|-------------------|--------|
| 250~700 | D/2 + 369 | 18 kg |
| 800~1800 | 0.121 d + 369 + δ | 36 kg |

D is outside diameter of pipe.

d is inside diameter of pipe.

δ is thickness of pipe.

Note: all dimensions are mm unless stated.

Mass flow of saturated steam (t/h)

| ID(mm) | 0.2MPa | | 0.4MPa | | 0.6MPa | | 0.8MPa | | 1.0MPa | | 1.2MPa | | 1.4MPa | | 13.7-185.8Kg/h | |
|--------|----------------|-------|----------------|-------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|
| 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 | 28.61ρ Kg/h |
| 20 | $9.88\sqrt{\rho}$ Kg/h | 50.87ρ Kg/h |
| 25 | $12.49\sqrt{\rho}$ Kg/h | 79.48ρ Kg/h |
| 32 | $20.35\sqrt{\rho}$ Kg/h | 130.22ρ Kg/h |
| 40 | $24.88\sqrt{\rho}$ Kg/h | 203.47ρ Kg/h |
| 50 | $37.1\sqrt{\rho}$ Kg/h | 317.93ρ Kg/h |
| 65 | $65.67\sqrt{\rho}$ Kg/h | 537.29ρ Kg/h |
| 80 | $99.66\sqrt{\rho}$ Kg/h | 813.89ρ Kg/h |
| 100 | $0.14\sqrt{\rho}$ | 1.27ρ |
| 125 | $0.22\sqrt{\rho}$ | 2.00ρ |
| 150 | $0.31\sqrt{\rho}$ | 2.86ρ |
| 200 | $0.65\sqrt{\rho}$ | 5.07ρ |
| 250 | $1.05\sqrt{\rho}$ | 7.95ρ |
| 300 | $1.35\sqrt{\rho}$ | 11.45ρ |
| 350 | $1.84\sqrt{\rho}$ | 15.58ρ |
| 400 | $2.4\sqrt{\rho}$ | 20.35ρ |
| 450 | $3.04\sqrt{\rho}$ | 25.75ρ |
| 500 | $3.77\sqrt{\rho}$ | 31.79ρ |

Note: ρ ---density of the superheat steam under operating condition (Kg/m³)

Volumetric flow of gas (Nm³/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. ρ --- density of gas under operating condition (Kg/m³)

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

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

Volumetric flow of liquid (m³/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. ρ ----density of liquid under operating condition (Kg/m³)

2. Density of water under normal temperature and pressure is 1000Kg/m³,

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

Procedures to specify ALVT vortex meters meters

**** Please contact your local SMC 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 | Please indicate maximum and minimum flow rates, in units of Kg/hr, LPM or GPM, etc. |
| Power Requirements | Please specify pipe size as well connection type (flange, threaded, etc..) |
| Process Pressure and Temperature | We will calibrate your flowmeter as close to your operating conditions as possible |
| Type of Electronics | Please specify either integral or remote electronics |
| Power Requirements | Specify your power requirements (24 V _{DC} or 115 V _{AC} or 230 V _{AC}) |

➤ Model Selection Guide

| ALVT meters | | | | | | | | | | | | | |
|--|----|----|------|----|------|----|----|------|----|----|------|-------------------|-------------|
| Example:ALVT-23-15D-11N-IN (0-20,000 kg/hr) | | | | | | | | | | | | | |
| ALVT- | ** | ** | _ ** | ** | _ ** | ** | ** | _ ** | ** | ** | _ ** | ** | Description |
| Flanged | 1 | | | | | | | | | | | Style | |
| Wafer | 2 | | | | | | | | | | | | |
| Insertion- fixed | 3 | | | | | | | | | | | | |
| Insertion- with ball valve mounting assembly | 4 | | | | | | | | | | | | |
| Liquid | 2 | | | | | | | | | | | Fluid | |
| Gas | 3 | | | | | | | | | | | | |
| Steam | 4 | | | | | | | | | | | | |
| ½" (15mm) | | | 015 | | | | | | | | | Line Size | |
| ¾" (20mm) | | | 020 | | | | | | | | | | |
| 1" (25mm) | | | 02 | | | | | | | | | | |
| 1 ¼" (32mm) | | | 03 | | | | | | | | | | |
| 1 ½" (40mm) | | | 04 | | | | | | | | | | |
| 2" (50mm) | | | 05 | | | | | | | | | | |
| 2 ½" (65mm) | | | 06 | | | | | | | | | | |
| 3" (80mm) | | | 08 | | | | | | | | | | |
| 4"-57" (100mm-1500mm) | | | ** | | | | | | | | | | |
| With digital display (standard only) | | | D | | | | | | | | | Display | |
| No display | | | N | | | | | | | | | | |
| 24V _{DC} | | | 1 | | | | | | | | | Power Supply | |
| 3.6V lithium battery | | | 2 | | | | | | | | | | |
| Dual power supply (24V _{DC} , 3.6V lithium battery) | | | 3 | | | | | | | | | | |
| No output | | | 0 | | | | | | | | | Signal Output | |
| Pulse output | | | 1 | | | | | | | | | | |
| Two wire 4-20mA DC output | | | 2 | | | | | | | | | | |
| Three wire 4-20mA DC output | | | 3 | | | | | | | | | | |
| RS-485 Communication | | | 4 | | | | | | | | | | |
| Hart Communication | | | 5 | | | | | | | | | | |
| Standard -40~480 °F (-40~250 °C) | | | N | | | | | | | | | Fluid Temperature | |
| High Temp 480~660 °F (250~350 °C) | | | H | | | | | | | | | | |
| 230 psig (16 bar) | | | 1 | | | | | | | | | Pressure | |
| 360 psi (25 bar) | | | 2 | | | | | | | | | | |
| 580 psi (40 bar) | | | 3 | | | | | | | | | | |
| 930 psi (64 bar) | | | 4 | | | | | | | | | | |
| Non | | | N | | | | | | | | | Explosion - Proof | |
| Explosive Isolated | | | G | | | | | | | | | | |
| Intrinsically safe | | | B | | | | | | | | | | |
| Flow range | | | | | | | | | | | | Flow rate | |