



# ALVT

## Vortex Flowmeter

### ALVT Series

## GENERAL

Vortex flow sensing technology relies on measuring the number of vortex pulses generated by a bluff body immersed in the flow stream. The 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.

## FEATURES

- Suitable for a wide variety of applications having steam, gas, or 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 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 10:1
- Available as an integrated mass flow vortex
- Area of measurement can be smaller than pipe connection for better rangeability

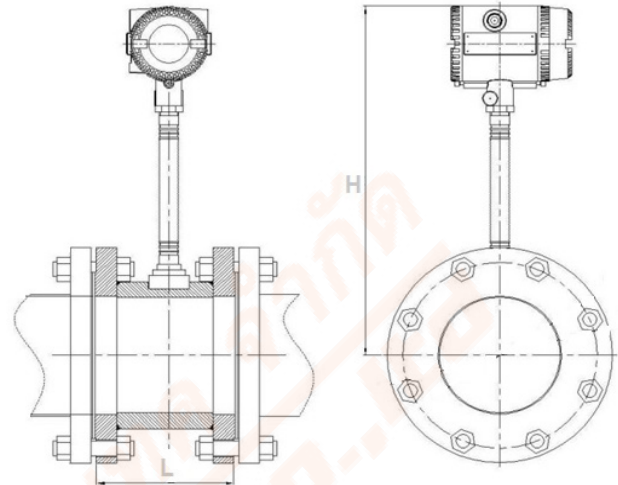


## SPECIFICATION

|                        |  |                         |   |
|------------------------|--|-------------------------|---|
| • Process Connections: | Wafer (standard), Flanged  | • Housing protection:   | IP65; IP67  |
| • Process temperature: | -20~+180°F (-5~+250°C) (with LCD display)                        | • Cable:                | 10 m free for remote version  |
| • Operating pressure:  | 232 psig (1.6MPa) standard; up to (428 psig)<br>6.4 MPa optional | • weight (approximate): | Wafer: 22~29 lbs (10 ~ 13kg)<br>to 12" (DN300)<br>Flange: Flange weight contact factory |
| • Velocity Range:      | Depends on fluid, pressure and temperature                       | • Signal Interface:     | RS485, HART   |
| • Liquids:             | 2~20 ft/s (0.6~6 m/s)  | • Display units:        | m <sup>3</sup> /h, kg/hr  |
| • Gas & Steam:         | 23~148 ft/s (5~65 m/s)   | • Keypad:               | Rate, Total   |
| • Accuracy             | 1.0% for liquid, 1.5% for gas and steam                          | • Power supply:         | 110/220 VAC or isolated 14~36 VDC   |
| • Repeatability:       | 0.33% for liquid, 0.5% for gas                                   | • NIST traceable:       | Yes   |
| • Turn down ratio      | 10:1   | • Data storage:         | EPROM storage up to 5 years   |
| • Material:            | Stainless Steel #304   | • Data logger:          | Reading, sampling times 0.5 S   |
| • Signal output:       | Pulse output, 2-wire 4~20mA DC, VDC, RS485, Hart, ModBus         |                         |   |
| • RAM Back-up          | Lithium Battery, 3.6VDC  |                         |   |

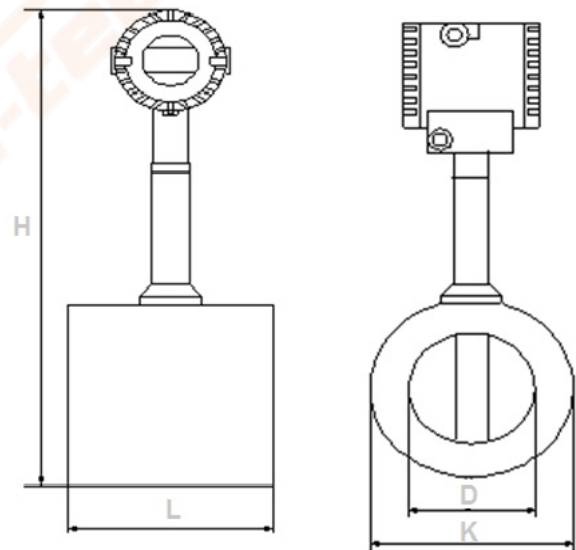
## ■ Flange

| DN  | L ± 3 |       | H ± 3 |       | Weight (kg) |       |
|-----|-------|-------|-------|-------|-------------|-------|
|     | class | class | class | class | class       | class |
|     | 150#  | 300#  | 150#  | 300#  | 150#        | 300#  |
| 25  | 180   | 180   | 390   | 390   | 4.68        | 5.68  |
| 32  | 180   | 180   | 390   | 390   | 5.42        | 6.82  |
| 40  | 180   | 180   | 400   | 400   | 5.97        | 8.36  |
| 50  | 180   | 200   | 400   | 400   | 7.58        | 8.84  |
| 65  | 200   | 200   | 400   | 410   | 10.4        | 11.96 |
| 80  | 200   | 200   | 415   | 435   | 12.39       | 15.75 |
| 100 | 220   | 220   | 430   | 457.5 | 17.24       | 23.89 |
| 125 | 220   | 220   | 430   | 481.5 | 19.29       | 30.63 |
| 150 | 220   | 220   | 505   | 522   | 24.82       | 39.91 |
| 200 | 220   | 220   | 550   | 579.5 | 35.73       | 58.79 |
| 250 | 250   | 250   | 590   | 632   | 51.93       | 85.16 |
| 300 | 300   | 300   | 630   | 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  |       |       |       | 337.8 | 4.35kg  |
| 50  | 75    | 84    | 160   | 348   | 4.77kg  |
| 65  |       |       |       | 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 |



### ■ Mass flow of saturated steam (kg/hr)

| Pressure | 0.3Mpa                 |        | 0.4Mpa                 |        | 0.6Mpa                |        | 0.7Mpa                 |        | 0.8Mpa                 |        | 1Mpa                   |        | 1.2Mpa                 |        | 1.5Mpa                 |        |
|----------|------------------------|--------|------------------------|--------|-----------------------|--------|------------------------|--------|------------------------|--------|------------------------|--------|------------------------|--------|------------------------|--------|
| Temp     | 133.5deg C             |        | 143.6deg C             |        | 158.9deg C            |        | 165deg C               |        | 170.7deg C             |        | 179.88deg C            |        | 187.96deg C            |        | 198.4deg C             |        |
| Density  | 1.615Kg/m <sup>3</sup> |        | 2.163Kg/m <sup>3</sup> |        | 3.17Kg/m <sup>3</sup> |        | 3.667Kg/m <sup>3</sup> |        | 4.162Kg/m <sup>3</sup> |        | 5.147Kg/m <sup>3</sup> |        | 6.127Kg/m <sup>3</sup> |        | 7.602Kg/m <sup>3</sup> |        |
| DN15     | 11                     | 63     | 12                     | 73     | 14                    | 88     | 15                     | 85     | 16                     | 101    | 18                     | 112    | 19                     | 123    | 23                     | 136    |
| DN20     | 13                     | 102    | 15                     | 116    | 18                    | 141    | 19                     | 151    | 20                     | 161    | 22                     | 179    | 24                     | 196    | 27                     | 218    |
| DN25     | 17                     | 133    | 19                     | 153    | 23                    | 185    | 25                     | 199    | 27                     | 212    | 30                     | 236    | 32                     | 257    | 36                     | 287    |
| DN32     | 30                     | 236    | 34                     | 271    | 41                    | 328    | 44                     | 352    | 47                     | 375    | 52                     | 417    | 57                     | 455    | 63                     | 507    |
| DN40     | 34                     | 340    | 39                     | 390    | 47                    | 470    | 51                     | 510    | 54                     | 540    | 60                     | 600    | 66                     | 660    | 73                     | 730    |
| DN50     | 63                     | 630    | 73                     | 730    | 88                    | 880    | 95                     | 950    | 101                    | 1,010  | 112                    | 1,120  | 122                    | 1,220  | 136                    | 1,360  |
| DN65     | 106                    | 1,060  | 121                    | 1,210  | 146                   | 1,460  | 158                    | 1,580  | 168                    | 1,680  | 187                    | 1,870  | 204                    | 2,040  | 227                    | 2,270  |
| DN80     | 148                    | 1,480  | 170                    | 1,700  | 205                   | 2,050  | 221                    | 2,210  | 235                    | 2,350  | 262                    | 2,620  | 285                    | 2,850  | 318                    | 3,180  |
| DN100    | 222                    | 2,220  | 242                    | 2,420  | 293                   | 2,930  | 315                    | 3,150  | 336                    | 3,360  | 374                    | 3,740  | 408                    | 4,080  | 454                    | 4,540  |
| DN125    | 318                    | 3,180  | 363                    | 3,630  | 440                   | 4,400  | 473                    | 4,730  | 504                    | 5,040  | 561                    | 5,610  | 612                    | 6,120  | 681                    | 6,810  |
| DN150    | 423                    | 4,230  | 484                    | 4,840  | 586                   | 5,860  | 631                    | 6,310  | 672                    | 6,720  | 747                    | 7,470  | 815                    | 8,150  | 908                    | 9,080  |
| DN200    | 847                    | 8,470  | 969                    | 96,900 | 1,173                 | 11,730 | 1,262                  | 12,620 | 1,344                  | 13,440 | 1,495                  | 14,950 | 1,631                  | 16,310 | 1,815                  | 18,150 |
| DN250    | 1,270                  | 12,700 | 1,453                  | 14,530 | 1,769                 | 17,690 | 1,892                  | 18,920 | 2,016                  | 20,160 | 2,242                  | 22,420 | 2,446                  | 24,460 | 2,725                  | 27,250 |
| DN300    | 2,116                  | 2,160  | 2,422                  | 24,220 | 2,932                 | 29,320 | 3,154                  | 31,540 | 3,360                  | 33,600 | 3,737                  | 37,370 | 4,077                  | 40,770 | 4,541                  | 45,410 |

\*Note: The pressure in table is gauge pressure

### ■ Mass flow of superheated steam (kg/hr)

| ID (mm) | min flow |               | max flow |               |
|---------|----------|---------------|----------|---------------|
| 15      | 8.24     | $\sqrt{\rho}$ | 49.5     | $\sqrt{\rho}$ |
| 20      | 9.88     | $\sqrt{\rho}$ | 79       | $\sqrt{\rho}$ |
| 25      | 13.12    | $\sqrt{\rho}$ | 104      | $\sqrt{\rho}$ |
| 32      | 23       | $\sqrt{\rho}$ | 184      | $\sqrt{\rho}$ |
| 40      | 26.65    | $\sqrt{\rho}$ | 265      | $\sqrt{\rho}$ |
| 50      | 49.41    | $\sqrt{\rho}$ | 494      | $\sqrt{\rho}$ |
| 65      | 82.35    | $\sqrt{\rho}$ | 585      | $\sqrt{\rho}$ |
| 80      | 115.3    | $\sqrt{\rho}$ | 823      | $\sqrt{\rho}$ |
| 100     | 164.7    | $\sqrt{\rho}$ | 1,153    | $\sqrt{\rho}$ |
| 125     | 247.1    | $\sqrt{\rho}$ | 1,647    | $\sqrt{\rho}$ |
| 150     | 329.4    | $\sqrt{\rho}$ | 2,471    | $\sqrt{\rho}$ |
| 200     | 658.8    | $\sqrt{\rho}$ | 3,294    | $\sqrt{\rho}$ |
| 250     | 988.2    | $\sqrt{\rho}$ | 6,588    | $\sqrt{\rho}$ |
| 300     | 1,647    | $\sqrt{\rho}$ | 9,882    | $\sqrt{\rho}$ |

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

### ■ Volumetric flow of gas (N m<sup>3</sup>/hr)

| ID (mm) | Flow range | Frequency- Hz |
|---------|------------|---------------|
| 15      | 5-30       | 460-3700      |
| 20      | 6-50       | 220-3400      |
| 25      | 8-60       | 180-2700      |
| 32      | 14-100     | 130-1400      |
| 40      | 18-180     | 90-1550       |
| 50      | 30-300     | 80-1280       |
| 65      | 50-500     | 60-900        |
| 80      | 70-700     | 40-700        |
| 100     | 100-1000   | 30-570        |
| 125     | 150-1500   | 23-490        |
| 150     | 200-2000   | 18-360        |
| 200     | 400-4000   | 13-325        |
| 250     | 600-6000   | 11-220        |
| 300     | 1000-10000 | 9-210         |

\*Note: Standard condition 20°C, 0.1MPa (absolute pressure), or under atmosphere at 20°C

### ■ Volumetric flow of liquid (m<sup>3</sup>/hr)

| ID (mm) | Flow range | Frequency- Hz |
|---------|------------|---------------|
| 15      | 1.5-6      | 90-900        |
| 20      | 1.2-8      | 40-600        |
| 25      | 2-16       | 35-400        |
| 32      | 2.2-20     | 20-250        |
| 40      | 2.5-25     | 10-240        |
| 50      | 3.5-35     | 8-190         |
| 65      | 6-60       | 7-150         |
| 80      | 13-130     | 6-110         |
| 100     | 2-200      | 5-90          |
| 125     | 30-300     | 4.5-76        |
| 150     | 50-500     | 3.8-60        |
| 200     | 100-1000   | 3.2-48        |
| 250     | 150-1500   | 2.5-37.5      |
| 300     | 200-2000   | 2.2-30.6      |

Please contact your local SmartMeasurement application engineer  
You also need to provide the following information:

|                                     |
|-------------------------------------|
| TYPE OF FLUID (LIQUID/GAS OR STEAM) |
| FULL SCALE FLOW                     |
| LINE SIZE                           |
| PROCESS PRESSURE AND TEMPERATURE    |
| TYPE OF ELECTRONICS                 |
| POWER REQUIREMENTS                  |

Please provide the name of your fluid, including operating density and viscosity

Maximum and minimum flow rates, units must be Kg/hr, Lb/hr, LPM or GPM

Please specify your pipe size as well connection type (flange, threaded)

We will calibrate your meter as close to your operating conditions as possible

Please indicate if you want integral or remote electronics

Please specify your power requirements such as 24 V<sub>DC</sub>, 115 V<sub>AC</sub> or 230 V<sub>AC</sub>

| ALVT   |   |    |    |    |     |  |  |  |  |                 |
|--|---|----|----|----|-----|--|--|--|--|-----------------|
| EXAMPLE:ALVT-2-3-40-D-1-2-0-N-1-NNN                                  |   |    |    |    |     |  |  |  |  |                 |
| ALVT   |   | ** | ** | ** |     |  |  |  |  | DESCRIPTION     |
| Flanged  | 1 |    |    |    |     |  |  |  |  | Style           |
| Wafer  | 2 |    |    |    |     |  |  |  |  |                 |
| Liquid   | 2 |    |    |    |     |  |  |  |  | Fluid           |
| Gas  | 3 |    |    |    |     |  |  |  |  |                 |
| Steam  | 4 |    |    |    |     |  |  |  |  |                 |
| Inline type DN15~DN300 (½"~12")                                      |   |    | ** |    |     |  |  |  |  | Line Size       |
| Integral with digital display - standard                             |   |    |    |    | D   |  |  |  |  | Display         |
| Remote with 5m cable   |   |    |    |    | R   |  |  |  |  |                 |
| 13.5~45 V <sub>DC</sub> - Standard                                   |   |    |    |    | 1   |  |  |  |  | Power Supply    |
| 3.6V lithium battery -no outputs                                     |   |    |    |    | 2   |  |  |  |  |                 |
| 13.5~45 V <sub>DC</sub> + lithium battery                            |   |    |    |    | 3   |  |  |  |  |                 |
| 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 - SS #304  |   |    |    |    | NN  |  |  |  |  | Options         |
| Special material - SS #316   |   |    |    |    | 316 |  |  |  |  |                 |
| Mass flow without PT100 and pressure transmitter                     |   |    |    |    | MS  |  |  |  |  |                 |
| Mass flow with PT100 and pressure transmitter                        |   |    |    |    | MT  |  |  |  |  |                 |
| Flow computer - 24 V <sub>DC</sub> power, 4-20mA output, LED display |   |    |    |    | FC  |  |  |  |  |                 |

