**BIMCO™**

# BOMBAY INSTRUMENT MFG. CO.

**AN ISO 9001:2015 CERTIFIED COMPANY**

## Intelligent Vortex Flow Meter Transmitter/Sensor

## Vortex Flow Meter Sensor

## Vortex Flow Meter Transmitter

MODEL NO. : 10-VOR-CLFL



### 1. Summarization

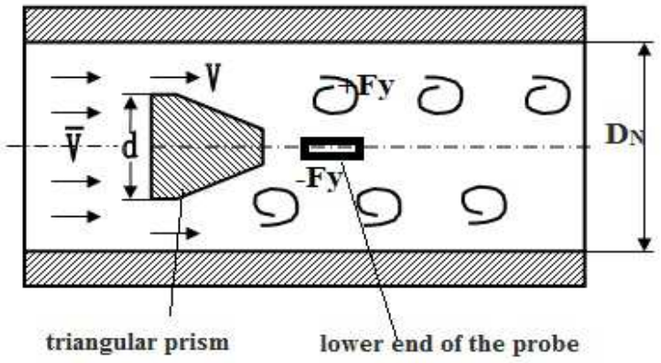
*Products of Vortex Flow Meter, basically designed from taking in advanced technologies of developed countries and summing up production experiences of many years, have achieved intellectualization, standardization, serialization, universalization and mold production of products, ensuring standards for quality and elegant appearance. Those products have a number of features such as advanced circuits, low power consumption, wide ratio of measurement range, simple structure, a little resistance loss, durable design, extensive use, long service life, stable system and easy for installation and debugging.*

### 2. Principles

*Vortex Flow Meter Sensor is a flow measuring instrument of oscillating of fluid developed according to the principle of "Karman's vortex street". Fluid in round tube is vertically plugged in non-streamlined cylinder, then both sides of cylinder would form two lines vortexes alternately, see Figure 1, frequency of vortex separation is in proportion to flow rate, but in inverse proportion to width of the cylinder.*

***When both sides of cylinder form two lines vortexes alternately, at the same time the force of ±Fy acting on the probe, and frequency of vortex separation can be detected by using mechanical sensor, then the flow speed and at last we can get the flow rate from cross sectional area of DN(the inside diameter of pipeline).***

**Picture 1** The Probe (External)




3. Structure and related dimensions(see picture 2)

| 规 格 | D | H | L |
|---|---|---|---|
| DN25 | 68 | 390 | 80 |
| DN32 | 68 | 390 | 80 |
| DN40 | 80 | 400 | 80 |
| DN50 | 88 | 410 | 80 |
| DN65 | 105 | 420 | 80 |
| DN80 | 120 | 435 | 80 |
| DN100 | 148 | 480 | 80 |
| DN125 | 174 | 500 | 85 |
| DN150 | 196 | 520 | 90 |
| DN200 | 250 | 600 | 105 |
| DN250 | 300 | 620 | 120 |
| DN300 | 350 | 660 | 140 |

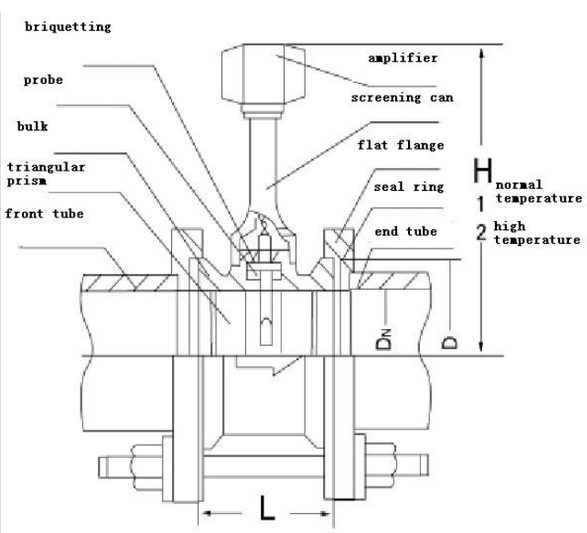



CHART 2 The structure of sensor

**Picture 2(Structure of sensors)**

## 4. Basic technical performance

| | |
|---|---|
| Measuring medium | Liquid，gas，vapor |
| Medium temperature | Normal temperature: -40℃~+80℃ High temperature +280℃ Maximum temperature +320℃ |
| Medium pressure | 1.0MPa, 1.6MPa, 2.5MPa…32MPa |
| Intrinsic error | Full tube type: ±0.5%, ±1.0%, ±1.5%<br>Plug-in type: ±2.5% |
| Ratio of measurement range | 1:10 1:20 1:30 1:40 |
| Range of flow speed | Liquid（water）:0.25M/S~9.5M/S<br>Gas:4M/S~78M/S Vapor:3M/S~78M/S |
| Caliber $D_N$ (mm) | Full tube type:<br>15,25,(32),40,50,(65),80,100,(125),150,200,250,300<br>Plug-in type: 300~3000 |
| Reynolds number | Re>4000 |
| Drag coefficient | Full tube type: $C_d$ ≤2.4, Plug-in type: Drag loss can be omitted |
| Degree of anti-explosion | Intrinsic safety type: ia Ⅱ $T_2$~$T_5$,<br>Explosion-proof type: d Ⅱ $BT_4$ |
| Ambient temperature | Non anti-explosive area: -40℃~+55℃<br>Anti-explosive area: -20℃~+55℃ |
| DC supply | +3.6V, +12V, +24V (Field data show the supply is +3.6V for 3 to 5 years) |
| Output signal | Frequency impulse signal: 1~2600Hz, low level≤1V, high level≥5V, transmitter: two-wire |

| | |
|---|---|
| | system 4~20mA |
| Material | 1Cr18Ni9Ti |

## 5. Lectotype and Chart Models

**Model Instruction**

| BIMCO | Intelligent Vortex flow meter | |
|---|---|---|
| nominal diameter | -XXX | 100 means DN100 |
| medium | 1 | liquid |
| | 2 | gas |
| | 3 | vapour |
| form of structure and connection method | 0 | common type |
| | 1 | flange type |
| | 2 | Full tube flange type |
| | 3 | simple plug-in type |
| | 4 | ball valve plug-in type |
| | 5 | high pressure type |
| | 6 | diving type |
| | 7 | anticorrosion type |
| Output signal | 0 | No output |
| | 1 | 4~20mA |
| | 2 | pulse |
| | 3 | hart |
| | 4 | RS485 |
| environmental conditions | 1 | common type |
| | 2 | explosion proof type |

| | | |
|---|---|---|
| Method of compensation | 0 | No compensation |
| | 1 | Temperature compensation |
| | 2 | pressure compensation |
| | 3 | temperature and pressure compensation |
| power supply | 1 | Battery power 3.6V,no output |
| | 2 | Battery power & 24V |
| | 3 | 24VDC |
| pressure | P1 | Normal pressure |
| | P2 | High pressure |
| temperature | T1 | Normal temperature |
| | T2 | High temperature |
| Flow range | -XXX | For example:1000 which means corresponds to maximum flow1000 m3/h |



## Ⅴ. Range of flow ( lower limit flow related to density)

**Chart 6**

| model | DN(mm) | Range of flow(m3/h) | | | accuracy |
|---|---|---|---|---|---|
| | | liquid | gas | steam | |
| **BIMCO-25** | **25** | **1.4~12** | **8.8~124** | **7~124** | **1.0/1.5** |
| BIMCO-32 | **32** | **2.0~20** | **15~200** | **12~200** | |
| BIMCO-40 | **40** | **3.2~36** | **23~300** | **18~300** | |

| | | | | | |
|---|---|---|---|---|---|
| BIMCO -50 | **50** | **5~56** | **35~450** | **28~450** | |
| BIMCO -65 | **65** | **8.2~96** | **63~820** | **50~820** | |
| BIMCO -80 | **80** | **12.5~145** | **90~1200** | **75~1200** | |
| BIMCO -100 | **100** | **20~224** | **142~1950** | **120~1950** | |
| BIMCO -125 | **125** | **30~352** | **220~3000** | **175~3000** | |
| BIMCO -150 | **150** | **44~512** | **320~4400** | **260~4400** | |
| BIMCO -200 | **200** | **79~920** | **565~7800** | **440~7800** | |
| BIMCO -250 | **250** | **140~1200** | **850~12400** | **720~12400** | |
| BIMCO -300 | **300** | **175~2020** | **1250~17500** | **1020~17500** | |
| | | | | | |
| BIMCO -300 | **300** | **127~1650** | **1810~13500** | **1260~13500** | |
| BIMCO -400 | **400** | **226~2950** | **3250~23800** | **2250~23800** | |
| BIMCO -500 | **500** | **353~4600** | **5560~37800** | **3500~37800** | |
| BIMCO -600 | **600** | **510~6620** | **7320~54600** | **5100~54600** | **2.5** |

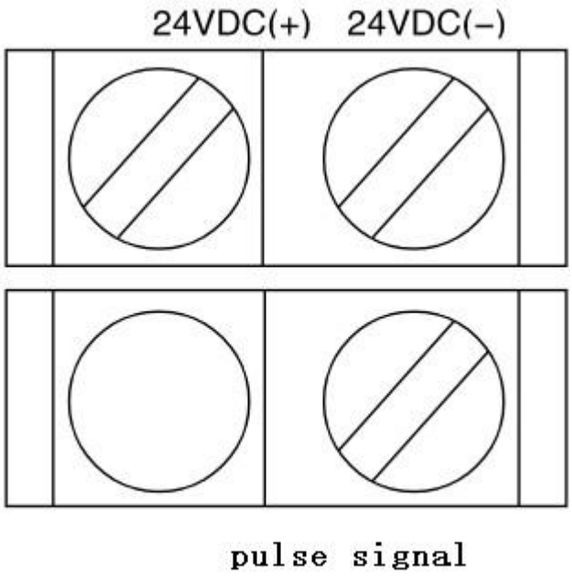
| | | | | | |
|---|---|---|---|---|---|
| BIMCO -800 | **800** | **910~1180 0** | **13200~96 700** | **9100~967 00** | |
| BIMCO -1000 | **1000** | **1450~185 00** | **20100~1516 00** | **14500~15 1600** | |
| BIMCO -1200 | **1200** | **2050~256 50** | **2750~209 000** | **20500~20 9000** | |
| BIMCO -1500 | **1500** | **3200~403 00** | **45500~33 5000** | **32000~33 5000** | |
| BIMCO -2000 | **2000** | **5600~714 00** | **80200~60 8600** | **56000~60 8600** | |



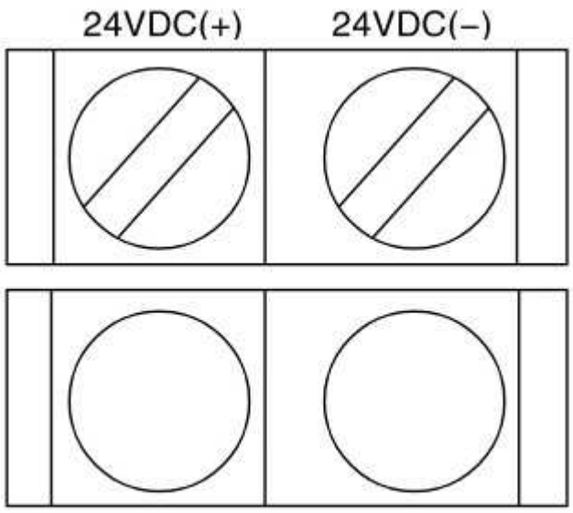
## 9. Wiring diagram

Wiring of sensors, wiring of transmitter

**Picture 10 wire connection of sensor**




**Picture 11 wire connection of transmitter**




**Sensors is three-wire system:** power supply, signal and power ground; use three-core shielded cable; shielding line is at one side of the sensor connecting outside; put the end of secondary meter connecting to earth is not allowed; the three cores should connect power supply, signal( Ω ) and power ground separately(see chart 10).

**Transmitter is two-wire system:** use two-core cable, "+" and "-" of vortex flow meter should connect +24V and "+" of signal input of tested meter, while "-" of signal input should connect "-" of 24VDC, the circuit outputs 4~20mA.(see chart 11).

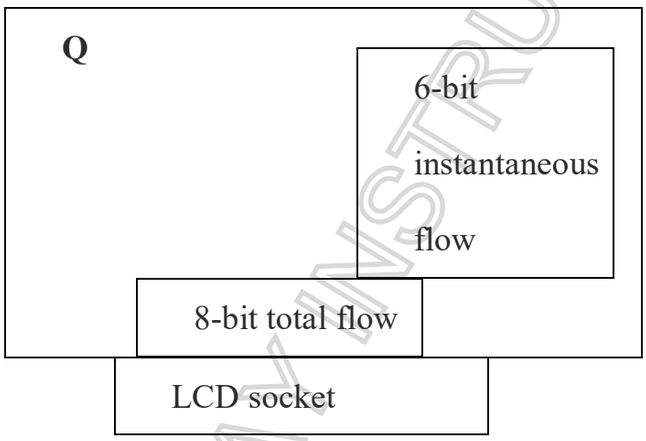
## 10. Features of performance

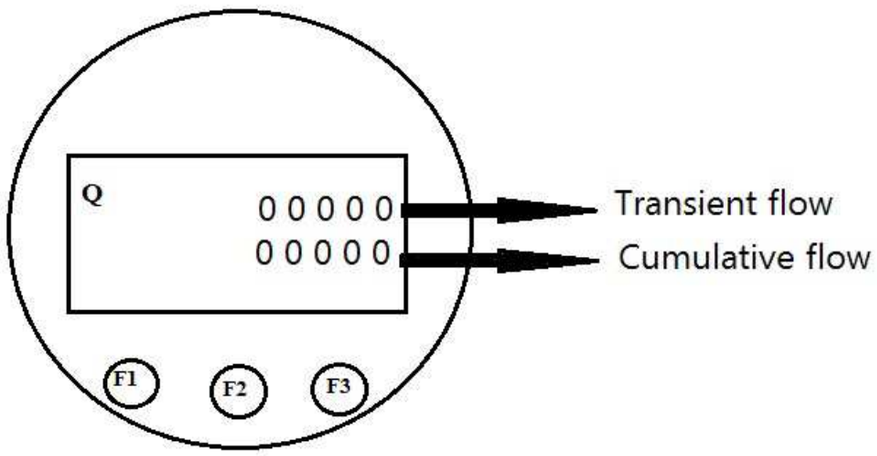
1. The products are of amplification board of micro consumption and current output.

2. The products can output current signal of 4~20mA corresponding to flow signal.
3. The products can show grand total flow and instantaneous flow simultaneously.
4. The products have the revise function of five non-linearity.
5. The products have the function of eliminating small signals.
6. The products can set freely the damping time.
7. The products adopt advanced surface mounting technology, getting small size and compact structure.
8. The design is advanced and used universally , applying to all kinds of Calibers (20mm~300mm) of liquid and gas medium.
9. The products are humanity design with user-friendly control.
10. The products are of advanced circuit design, wide ratio of measurement range and no self-excitation.

**11. Methods of setting parameter**

1. Display board diagram as below:






**Panel arrangement diag**

**Ordering Instruction:**

1. Measuring medium____and density____kg/$m^3$
2. Working pressure____Mpa and temperature____℃.
3. Flow range____minimum flow____ frequently-used flow____maximum flow caliber____(mm).
4. Environmental conditions: whether there is anti-explosion or not, environmental temperature____℃.
5. The distance from the sensor and the display meter____m, whether there is temperature compensation and pressure compensation or not.
6. Power supply of the sensor____V.



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