STLU Vortex Flow Meter

Main Features

- STLU Intelligent Vortex Flow Transducer is piezocrystal built in bluff body to avoid fluid turbulence caused by external type, no zero drift, and high reliability.
- Option with built-in temperature and pressure and temperature compensation
- By lots of wave analysis of vortex flow transducer for a long time, Silver has designed the most scientific probe shape, wall thickness, height, probe rod diameter and matching piezocrystal, adopts advanced CNC to machine to ensure technical parameters of proper alignment and smooth finish etc., and with special treating process to maximatily overcome existed signal influence by intrinsic self-oscillation frequency.
- STLU Intelligent Vortex Flow Transducer has good commonality and interchangeability. Adopt advanced CNC to machine parts such as transducer body and bluff body etc. To ensure machining accuracy to make parts (especial for bluff body) has good commonality, so that, repeatability and accuracy won't be affected by parts change and get signal with high signal noise ratio and good stability.
- Simple & fixed structure, no moving parts, high reliability, convenient maintenance.
- Wide measuring range, turndown ratio can reach 10:1 in Reynolds Number $2\times10\sim 7\times 10.4\ 6$
- Detecting element not contact with the measured fluids directly, stable performance and long service life.
- Detecting probe and bluff body installed independently, and high temperature resistance piezocrystal sealed in bluff body make transducer simple structure, good commonality and high stability.
- Output pulse signal and current signal directly proportional to flowrate, and have RS-485, Hart, ModBus communication for convenient computer networking.
- When vortex flow transducer measures liquid volumetric flow, it does not need temperature, pressure compensation. Vortex output signal is linear to velocity, that is to say, directly proportional to volumetric flowrate. When measure gas or steam, it needs temperature and pressure compensation. Compensating pressure and temperature is to get volumetric flow of gas under standard state or mass flow of steam.
- Low pressure loss, just $1/4 \sim 1/2$ of orifice plate.
- In a specific range of Reynolds Number, flow character just refers to bluff body shape and dimension, and not affected by fluid pressure, temperature, viscosity, density and ingredients.
- Wide application, can measure flowrate of steam, gas, liquid etc

Working Principle

When a column body placed in flowing fluids in pipe, a series of vortices will be generated alternately on each side of the object as shown as below, these eddies known as "Karman Vortices", the frequency of the vortex shedding is related to the velocity of the fluid and the width of the body. Expressed by formula as below:

f=Sr .v/d

Thereinto   f----fre quency of Karman Vortex shedding

           Sr----Strouhal number

           v----velocity

           d----width of column object
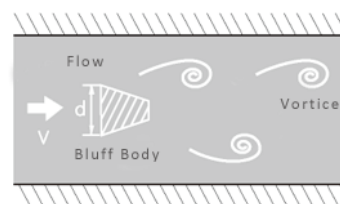
Because the frequency of the vortex shedding is proportional to the velocity, it can be used to calculate the instantaneous flow rate .

Strouhal number is a very important coefficient in the Vortex Flowmeter. In the range of straight line of St≈0.17 in curve, frequency of vort ex shedding is proportional to the velocity, so as long as the frequency (f) be detected, the velocity (v) will be obtained, and volumetric flowrate will be got according to v. For STLU Vortex Flowmeter, its frequency of the vortex shedding was detected by the stress force which exerted
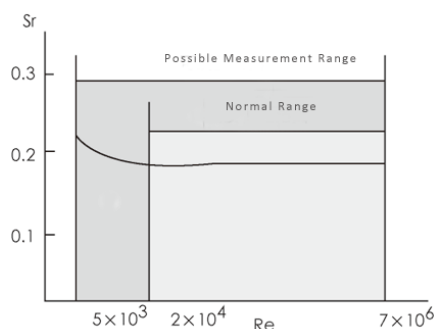
Technical Parameters

Table 1

Vortex Flow meter Main Technical Parameters		
Fluids	Gas, steam	Liquid
Accuracy	±1.5%	± 1.0%
Repeatability	±0.5%	±0.33%
Reynolds Number	2×10^{4}~7×10^{6}	
Media Temp. Standard	-40°C~+250°C	
Media Temp. Extension	-40°C~+300°C or higher	
Turn Down Ratio	1:6~1:30	
Size	DN25~DN300 in line type，250-1000 insertion type	
Pressure	1.6Mpa/2.5Mpa/4.0Mpa and others	
Velocity	5m/s ~70m/s	0.5 m/s~7m/s
Wet Parts Material	304 SST/316 SST	

Flange Material	Carbon steel/304 SST/316 SST
Bolt Material	Carbon steel/304 SST
Detector Material	316 SST
Connecting Rod	304 SST
Radiator	Aluminum alloy
Mounting	Wafer/Flange/Thread/Tri-clamp
Protection Level	IP65 /IP67
Power supply	24VDC(18VDC~30VDC)/Battery
Signal Output	(4-20)mA/ pulse
Communication	Hart/Modbus
Electrical connection	2-M20×1.5
Explosive Proof	Exd IIBT4/Exia IICT3-T6
Construction	Compact/Remote
Environment Temp.	With LCD:-10 ~60°C/ Without LCD: -20 ~60°C
Relative Humidity	5% ~90%

Model Selection

Table 2

Mark	
STLU	Silver Automation Instruments Vortex Flow meter
Code	Working Principle
VFN	Intelligent Karman Vortices Flowmeter
Code	Process Connection
1	Flanged(DN50~DN300)
2	Wafer type (DN15~DN300)
3	Fixed Inserted
4	Adjustable Inserted (without Ball Valve)
5	Adjustable Inserted (with Ball Valve)
6	Tri-clamp
7	Thread (please specify thread standard)
Code	Measured Fluid
2	Liquid
3	Gas
4	Steam

Code	Nominal Diameter				
015	15mm	05	50mm	15	150mm
020	20mm	06	65mm	20	200mm

02	25mm	08	80mm	25	250mm
03	32mm	10	100mm	30	300mm
04	40mm	12	125mm	Others	Inserted ≥250mm
Code	Indicator				
D	With Digital Indicator				
N	No Indicator (3 wire,　 pulse frequency output)				
Code	Power Supply				
1	24V DC				
2	3.6V Lithium Battery				
Code	Output Signal				
0	No output				
1	Pulse Output				
2	Two Wire :4~20mA DC				
4	Hart Protocol				
5	RS-485 (Modbus)				
Code	Fluid Temperature				
1	Standard -40~250°C(-40~120°C for inserted)				
3	High Temperature Type :+100~+350°C				
2	Specify				
Code	Pressure Rating				
Code	Standard	Code	Standard	Code	Standard
G0	GB 1.0Mpa	D0	DIN PN10	A1	ANSI Class 150
G1	GB 1.6Mpa	D1	DIN PN16	A2	ANSI Class 300
G2	GB 2.5 Mpa	D2	DIN PN25	A3	ANSI Class 600
G3	GB 4.0 Mpa	D3	DIN PN40	S	Special
Code	Explosion Proof				
N	Non				
d	Flameproof				
i	Intrinsically Safe				
Code	Flow Meter Construction				
0	Compact display				
Code	Protection Level				
0	IP65				
1	IP67				
Code	Compensation				

B0	Non compensation
BT	Built-in temperature compensation
BP	Built-in pressure compensation
BPT	Built-in temperature and pressure compensation
EPT	External temp & pressure compensation (RTD, pressure transmitter and flow totalizer)
EP	External pressure compensation (pressure transmitter and flow totalizer)
ET	External Temperature compensation (pressure transmitter and flow totalizer)
Code	Wet Parts material
M0	Standard 304 SST
M1	Stainless steel 316
M2	Others

Dimensions

(unit :mm)

⬊   **Wafer Connection**

DN	A	B	C1	C2	CH
15	68	54	405	460	460
20	68	54	405	460	460
25	68	54	405	460	460
32	78	68	405	460	460
40	80	78	410	470	470
50	82	86	410	470	470
65	84	104	430	490	490
80	84	118	440	500	800
100	90	138	460	520	520
125	90	168	490	550	550
150	100	194	520	580	580
200	100	248	570	630	630
250	115	298	630	690	690
300	130	348	680	740	740

➘ **Flange connection**

Table 5
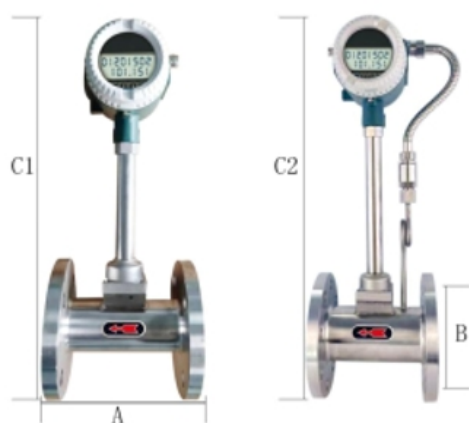
DN	A	B	C1	C2	D	N
15	140	65	400	460	M12	4
20	140	75	400	460	M12	4
25	160	85	410	470	M12	4
32	160	100	430	490	M16	4
40	160	110	440	500	M16	4
50	180	125	450	510	M16	4
65	180	145	470	430	M16	4
80	180	160	490	550	M16	8
100	180	180	500	560	M16	8
125	180	210	540	600	M16	8
150	180	240	560	620	M20	8
200	220	295	630	690	M20	12
250	220	355	680	740	M24	12
300	220	410	730	790	M24	12

Flow Range

Table 8

Size (mm)	Flange type		Insertion type	
	Liquid Flow Range (m3/h)	Gas Flow Range (m3/h)	Liquid Flow Range (m3/h)	Gas Flow Range (m3/h)
15	1~5	4~12		
20	1.2~10	6~25		
25	1.5~12	8~50		
32	2~18	18~120		
40	3~25	25~180		
50	3.5~40	35~300		
65	6.5~70	50~500		

80	12~130	80~800		
100	18~160	120~1200		
125	22~250	180~1800		
150	50~400	320~2600		
200	70~700	560~5500	70~700	560~5500
250	140~1200	890~8000	140~1200	890~8000
300	200~1800	1360~11000	200~1800	1360~11000
350			200~1800	1560~15000
400			350~3000	2750~27000
500			500~4000	4500~43000
600			700~5600	6200~60000
800			900~7200	11000~110000
1000			1300~12000	17000~170000
＞1000				