Product Data Sheet
September 2017
REV. 3.2

VF404 VORTEX FLOWMETER

FOR GAS, STEAM AND LIQUID

Flange Type

Wafer Type

Insertion Type

The VF404 series vortex flowmeters offer accurate, low-maintenance flow measurement for gas, steam and liquid applications. It is widely used in chemical industry, power plant, mining, metallurgy plant, steam plant and water conservancy.

The VF404 series vortex flowmeters utilize robust piezoelectric elements to detect Karman vortex frequency behind a shedder bar. Thanks to the advanced proprietary spectrum signal processing technology, the VF404 is able to provide excellent vibration immunity for stable and accurate flow measurements at low flows without any need for start-up tuning. The main features include:

- No moving parts to wear and tear. Low Maintenance
- No need for Zero adjustment. No adjustment cost
- Advanced spectrum signal process and unique ground design for guaranteed high sensitivity and excellent anti-vibration performance
- Easy Installation, with flange, wafer or insertion process connection
- High degree of safety. Leak-free
- Low pressure drop
- Robust construction. Shedder bar and sensor body are made from steel. Reliable even at high pressure, high temperature
- User friendly. Easy and simple to program

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VF404 VORTEX FLOWMETER

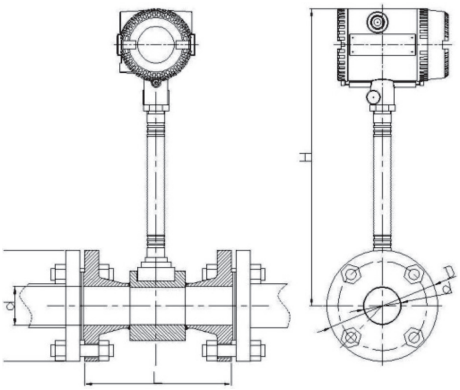
FOR GAS, STEAM AND LIQUID

SPECIFICATIONS - **FLANGE TYPE**

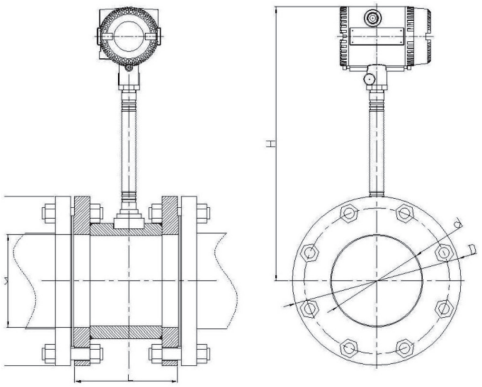
The VF404-F flange-type vortex flowmeter has integrated the flow convertor and flow sensor into one assembly. They whole system is robust and reliable. It has flanges on both ends of the flow sensor spool-piece. The flange could be made according to DIN or ANSI standard. The whole system is calibrated with water in factory in order to guarantee the accuracy.

The VF404-F is normally powered by an external 24VDC power supply. Abundant optional output interfaces, such as 4-20mA and RS485/Modbus, make this product an ideal choice for process control and various gas/steam/liquid flow metering applications.

VF404-F Drawings:



DN25~DN125 (1”~5”)



DN150~DN300 (6”~12”)

Size	d (mm)	D (mm)	L (mm)	H (mm)	n (# of holes)*	d1 (diameter of screw holes)*
DN 25 (1″)	26.6	110	173.2	389	4	15.9
DN 32 (1 ¼″)	35.1	115	182.2	393.3	4	15.9
DN 40 (1 ½″)	40.9	125	195.2	396.3	4	15.9
DN 50 (2″)	52.5	150	199.2	401.5	4	19.1
DN 65 (2 ½″)	62.7	180	211.2	409	4	19.1
DN 80 (3″)	77.9	190	220.2	416.5	4	19.1
DN 100 (4″)	102.3	230	240.2	427.5	8	19.1
DN 125 (5″)	128.2	255	274.2	441	8	22.3
DN 150 (6″)	154.1	280	171	453.5	8	22.3
DN 200 (8″)	202.7	345	207.4	478.5	8	22.3
DN 250 (10″)	254.6	405	220.6	504.5	12	25.4
DN 300 (12″)	304.8	485	233.8	529.5	12	25.4

***Note:** The data are for 1.6MPa DIN flange.*

*For other flanges, please contact **support@USonicmetering.com** for the information.*

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Nominal Size	DN25 ~ DN300 (1″~ 12″)
Accuracy	
• Gas / Steam	±1% of reading. High accuracy version (±0.5% but with turndown ratio of 1:4) available upon request
• Liquid	±1% of reading
Repeatability	Better than ±0.35%
Measurement Range in Velocity	
• Gas / Steam	7m/s ~ 70m/s
• Liquid	0.7m/s ~ 7m/s
Measurement Range in Flowrate	Refer to Table 1 at Page 6
Pressure Rating	1.6MPa (default)
	Optional 2.5MPa or 6.3MPa
Medium Temperature	-20ºC ~ +120ºC /-4°F ~ +248°F (default)
	-20ºC ~ +280ºC/-4°F ~ +536°F
	-20ºC ~ +350ºC/-4°F ~ +662°F (high temperature version , available upon request)
Medium Type	Gas – air, compressed air, nature gas, LPG (Liquefied etroleum Gas), fla e-gas, BFG(Blast Furnace Gas), mixed gas and other single-component or multi-component gas
	Steam - saturated or superheated
	Liquid - Hot water, cooling water, light oil ,chemical liquid
	Avoid multiphase fl w and sticky fluid
Display	Large LCD, two lines, for displaying instantaneous fl w, fl w total and other parameters
Totalizer	Flow totalizer with 8 digits
Output Signals	Pulse - opto-isolated Open Circuit Transistor (OCT) interface. Voltage level: Low ≤0.7V; High ≥4.5V. Load: > 150Ohm
	4-20mA. Accuracy: ±0.1%. Load: 500Ohm at 24VDC. 2 wire. Distance ≤1000m
	Cable connector - M20x1.5
	Note: battery powered version does not have output signal
Communication	RS485 available on some models. Please refer to the model number section
Sensor Body Material	304 SS or 316 SS (1Cr18Ni9Ti)
Pipe Connection	DIN flange (default)
	ASME 150# ANSI flang
Environment	Temperature -10ºC ~ +55ºC
	Humidity 5% ~ 90%
Power Supply	External Power supply 24VDC
	Battery Power Supply (available on some models): 19Ah /3.6V lithium battery for more than 9 months
Protection Class	IP65

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VF404 VORTEX FLOWMETER

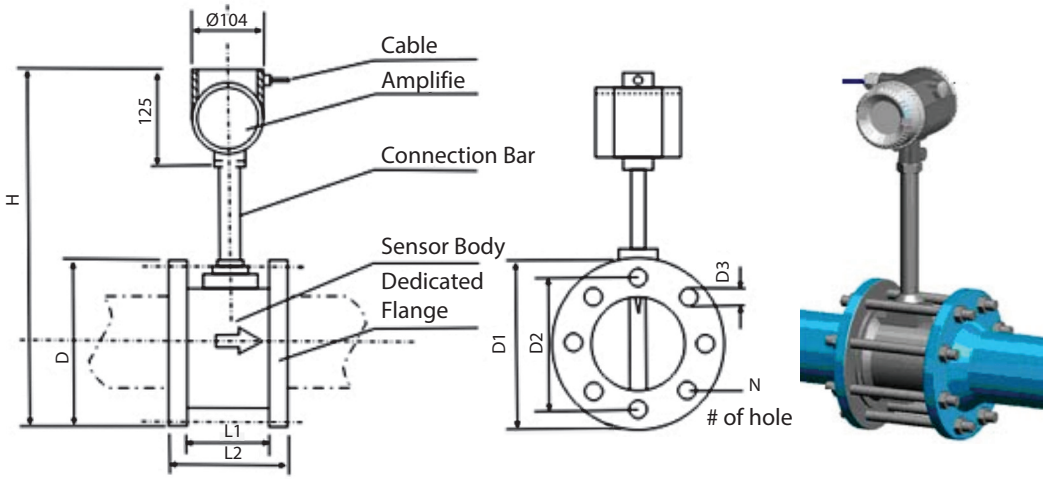
FOR GAS, STEAM AND LIQUID

SPECIFICATIONS - **WAFER TYPE**

This type of flowmeter, namely VF404-W, does not have flanges built on both ends of the spool-piece. To connect the flow sensor to pipe line, a pair of dedicated flanges should be used (see figure below). The flanges are normally welded on to the pipe.

The main unit (electronic part) of the VF404-W is the same as that of the VF404-F which is mentioned in the previous section.

VF404-W Drawings:



Nominal Size	L1 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	N (# of holes)
DN 25 (1″)	65	130	100	13	4
DN 32 (1 ¼″)	70	145	120	13	4
DN 40 (1 ½″)	75	145	120	13	4
DN 50 (2″)	75	160	132	17	4
DN 65 (2 ½″)	75	180	144	17	6
DN 80 (3″)	84	192	160	17	6
DN 100 (4″)	90	230	190	17	8
DN 125 (5″)	100	242	210	17	8
DN 150 (6″)	120	280	240	21	8
DN 200 (8″)	150	335	296	21	12
DN 250 (10″)	160	405	354	21	12
DN 300 (12″)	170	460	412	21	12

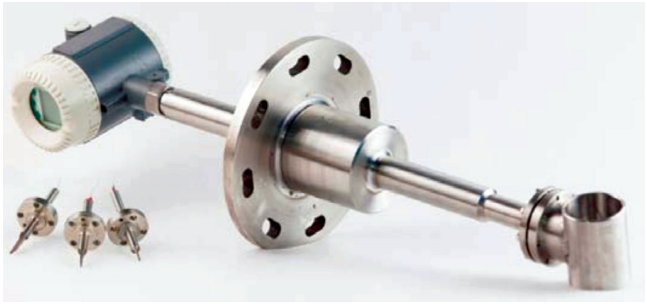
VF404 VORTEX FLOWMETER
FOR GAS, STEAM AND LIQUID

Nominal Size	DN25 ~ DN300 (1″ ~ 12″)
Accuracy	
• Gas / Steam	±1% of reading
• Liquid	±1% of reading
Repeatability	Better than ±0.35%
Measurement Range in Velocity	
• Gas / Steam	7m/s ~ 70m/s
• Liquid	0.7m/s ~ 7m/s
Measurement Range in Flowrate	Refer to Table 1 at Page 8
Pressure Rating	1.6MPa (default)
	2.5MPa or 6.3MPa (optional)
Medium Temperature	-20ºC ~ +120ºC /-4°F ~ +248°F (default)
	-20ºC ~ +280ºC/-4°F ~ +536°F
	-20ºC ~ +350ºC/-4°F ~ +662°F (high temperature version, available upon request)
Medium Type	Gas – air, compressed air, nature gas, LPG (Liquefied etroleum Gas), fla e-gas, BFG(Blast Furnace Gas), mixed gas and other single-component or multi-component gas
	Steam - saturated or superheated
	Liquid - Hot water, cooling water, light oil ,chemical liquid
	Avoid multiphase fl w and sticky fluid
Display	Large LCD for displaying instantaneous fl w, fl w total and other parameters
Totalizer	Flow totalizer with 8 digits
Output Signals	Pulse - opto-isolated Open Circuit Transistor (OCT) interface. Voltage level: Low ≤0.7V; High ≥4.5V. Load: > 150Ohm
	4-20mA. Accuracy: ±0.1%. Load: 500Ohm at 24VDC. 2 wire. Distance ≤1000m
	Cable connector - M20x1.5
	Note: battery powered version does not have output signal
Communication	RS485 available on some models. Please refer to the model number section
Sensor Body Material	304 SS or 316 SS (1Cr18Ni9Ti)
Pipe Connection	Wafer type clamp joint. Clamp flange is made f om carbon steel.
Environment	Temperature -10ºC ~ +55ºC
	Humidity 5% ~ 90%
Power Supply	External Power supply 24VDC
	Battery Power Supply (available on some models): 19Ah/3.6V lithium battery for more than 9 months
Protection Class	IP65

VF404 VORTEX FLOWMETER
FOR GAS, STEAM AND LIQUID

SPECIFICATIONS - **INSERTION TYPE**

This type of flowmeter, namely VF404-I, does not have spool-piece. It comes with an insertion sensor which you can insert into your pipe (refer to the below picture.) For the installation, you would need first to attach a flange base onto your pipe by welding. Then, insert the sensor into the pipe through the base and tight the fixing bolts of both the flanges on sensor and that on the base.



Insertion sensor

Flange base

The insertion flowmeter advatages are the ease of installation and low cost for large pipe sizes. The integral temperature and integral pressure sensors allow direct mass flow measurement in steam and compensated flow measurement in compressed air and gases. These feature is called temperature and pressure compensation. This feature provide the most accurate readings regardless of the medium variable and characterics.
This insertion type is not recommended for pipes smaller than DN100 (or 4").

Table 1 – Flowrate Range and Pressure Rating for Insertion Type and Wafer Type Vortex Flowmeters

Size (mm)	Normal Flowrate Range (gas or steam) (m^3/h)	Extended Flowrate Range (gas or steam) (m^3/h)	Normal Flowrate Range (liquid) (m^3/h)	Extended Flowrate Range (liquid) (m^3/h)	Pressure Rating (MPa)
DN 100 (4″)	167~1970	127~1970	19.7~197	11.3~197	1.6
DN 125 (5″)	308~3080	198~3080	30.8~308	17.7~308	1.6
DN 150 (6″)	444~4440	286~4440	44.4~444	25.5~444	1.6
DN 200 (8″)	790~7900	508~7900	79~790	45.2~790	1.6
DN 250 (10″)	1235~12350	794~12350	123.5~1235	70.7~1235	1.6
DN 300 (12″)	1779~17790	1144~17790	177.9~1779	101.7~1779	1.6
DN 350 (14″)	2422~24220	1558~24220	242~2420	139~2420	1.6
DN 400 (16″)	3163~31630	2034~31630	316~3160	181~3160	1.6
DN 450 (18″)	4004~40040	2575~40040	400~4000	229~4000	1.6
DN 500 (20″)	4943~49430	3178~49430	494~4940	283~4940	1.6
DN 600 (24″)	7118~71180	4577~71180	711~7110	407~7110	1.6

VF404 VORTEX FLOWMETER
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Nominal Size	DN100 (4") and larger
Accuracy	
•Gas	±1.5% of FS
•Liquid	±1.5% of FS
Repeatability	±0.25%
Measurement Range in Velocity	
• Gas	175kg/h ~ 20100kg/h
• Liquid	175kg/h ~ 2010kg/h
Measurement Range in Flowrate	Refer to Table 1 at Page 8
Pressure Rating	1.6MPa
Medium Temperature	-40℃ ~ +250℃ /-40°F ~ +482°F
Medium Type	Gas – air, compressed air, natural gas, LPG (Liquefied Petroleum Gas), flare-gas, BFG(Blast Furnace Gas), mixed gas & wet, saturated or superheated steam
	Liquid - Hot water, cooling water, light oil ,chemical liquid
	Avoid multiphase fl w and sticky fluid
Display	Large LCD, two lines, for displaying instantaneous fl w, fl w total and other parameters
Totalizer	Flow totalizer with 8 digits
Output Signals	Pulse - opto-isolated Open Circuit Transistor (OCT) interface. Voltage level: Low ≤0.7V; High ≥4.5V. Load: > 150Ohm
	4-20mA. Accuracy: ±0.1%. Load: 500Ohm at 24VDC. 2 wire. Distance ≤1000m
	Cable connector - M20x1.5
	Note: battery powered version does not have output signal
Communication	RS485 available on some models. Please refer to the model number section
Sensor Body Material	304 SS or 316 SS (1Cr18Ni9Ti)
Pipe Connection	Insertion. Flanges base is made from carbon steel
Environment	Temperature -10℃ ~ +60℃
	Humidity 5% ~ 90%
Power Supply	External Power supply 24VDC
	Battery Power Supply (available on some models): 19Ah /3.6V lithium battery for more than 9 months
Protection Class	IP65

VF404 VORTEX FLOWMETER

FOR GAS, STEAM AND LIQUID

HOW TO ORDER

Model Selection for Flange Type and Water Type Flowmeters:

VF404 -□-□-□□-□□□-□-□-□-□-□-□-□-□-□-□

Connection Type

Flange Type	F
Wafer Type	W

Meter Type

Integral Type	I
Remote Type	R

Unit System

Metric Unit System (default)	DN
English Unit System	IN

Calibre

25~300 (DN) or 1~12 (IN)

Nominal Pressure

1.6MPa (default)	1
2.5MPa	2
6.3MPa	3
Other, please specify	4

Accuracy

1% (default)	A
0.5% (turndown ratio 1:4 only)	B

Sensor & Body Material

304 SS	1
316 SS	2
Other, please specify	3

Output

None (for Battery powered version)	1
24VDC / impulse and 4~20mA output	2
24VDC / impulse and Modbus 485 output	3
24VDC / temperature and pressure compensation / impulse output	4
24VDC / temperature and pressure compensation / impulse and Modbus 485	5
24VDC / temperature and pressure compensation / impulse and 4~20mA	6
Other, please specify	7

Enclosure

1	IP65 (default)
2	Other, please specify

Power Supply

A	Battery Powered
B	DC powered

Flange

1	DIN flange
2	ANSI RF#150
3	Other, please specify

Medium Temperature

1	-20°C ~ +120°C / -4°F ~ +248°F (default)
2	-20°C ~ +280°C / -4°F ~ +536°F
3	Other, please specify

Medium Type

A	Liquid
B	Gas
C	Saturated Steam
D	Superheated Steam
E	Other, please specify

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VF404 VORTEX FLOWMETER
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Model Selection for Insertion Type Flowmeter:

VF404-I-□-□□-□□□-□-□-□-□-□-□-□

Meter Type

Integral Type	I
Remote Type	R

Unit System

Metric Unit System (default)	DN
English Unit System	IN

Calibre

100~600 (DN) or 8~24 (IN)

Nominal Pressure

1.6MPa (default)	1
Other, please specify	2

Sensor Material

304 SS (default)	1
316 SS	2
Other, please specify	3

Output

None (for Battery powered version)	1
24VDC / impulse and 4~20mA output	2
24VDC / impulse and Modbus 485 output	3
24VDC / temperature and pressure compensation / impulse output	4
24VDC / temperature and pressure compensation / impulse and Modbus 485	5
24VDC / temperature and pressure compensation / impulse and 4~20mA	6
Other, please specify	7

Medium

Liquid	A
Gas	B
Steam	C

Power Supply

Battery Powered	A
DC powered	B

Enclosure

IP65 (default)	1
Other, please specify	2

Memo

About USonic Metering

USonic metering is a global leader in flow and energy management solutions. Through continuous innovation, we transform complex technology into VERY affordable, reliable solutions for accurate flow and energy measurement. USonic Metering offers water, heat, electricity and gas meters as well as AMR/AMI solutions.To find out how we can help today, please tell us about your application.