

Vortex Flow Meter



Wafer Connection



Flange Connection



Insertion Connection

1. General Information

This manual will assist you in installing, using and maintaining your flow meter. It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedure.

Warning

For your safety, review the major warnings and cautions below before operating your equipment.

1. Use only fluids that are compatible with the housing material and wetted components of your Vortex.
2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. During Vortex removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.
6. Handle the sensor carefully. Even small scratches or nicks can affect accuracy.
7. When tightening the Vortex, use a wrench only on the wrench flats.
8. For best results, calibrate the meter at least 1 time per year.

1.1 Product Description

VTF series Vortex flow meters are designed for measuring the volume/mass flow of liquids, gases and steam based on Karman vortex principle.

Adopting advanced differential algorithm along with measurement of isolation, shielding and wave filtering, VTF series vortex flow meters have the advantages of immunity on vibration and noise. Meanwhile, the liabilities of VTF series vortex flow meters are well guaranteed by unique sensor packaging technology.

Upon receipt, examine your meter for visible damage. The Vortex is a precision measuring instrument and should be handled carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact us.

Make sure the Vortex flow model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the Vortex. Refer to the nameplate for your customized product's specification.

2. Technical Data

Measuring system

Application range	(1) Gas; (2) Liquid; (3) Steam
Measured Value	
Primary measured value	Flow Rate
Secondary measured value	Volume flow ; (Pressure and Temperature is available for model with compensation)

Design

Features	
Modular construction	The measurement system consists of a flow sensor and a signal converter. It is available as compact and as separate version.
Compact version converter	N Type: Pulse output without local display
	A Type: 4-20mA Output without local display
	B Type: Local Display; Lithium Battery Power; No Output (Battery Part No.: ER26500)
	C Type: Local Display; 24V DC Power; 4-20mA Output; Optional Function: (1) Backup Power Supply: Lithium Battery (2) Modbus RS485 (3) Pulse Output
Connection	
	Flange: DN15-DN300
	Wafer: DN15-DN300
Measurement Ratio	Standard – 10:1

Measuring accuracy

Reference conditions	Flow conditions similar to EN 29104
	Medium: Water / Gas
	Electrical conductivity: $\geq 300 \mu\text{S/cm}$
	Temperature: $+10\dots+30^\circ\text{C}$ / $+50\dots+86^\circ\text{F}$
	Inlet section: $\geq 10 \text{ DN}$
	Operating pressure: 1 bar / 14.5 psig
Flow Meter Accuracy	For Liquid: 1.0% of rate For Gas and Steam: 1.5% of rate Insertion type: 2.5% of rate

Operating conditions

Temperature	
Process temperature	T1 Level: -20...+70°C
	T2 Level: -20...+250°C
	T3 Level: -20...+350°C
Ambient temperature (all versions)	Standard (with aluminum converter housing):
	-10...+55°C
Storage temperature	-20...+70°
Pressure	
EN 1092-1	DN200...DN300: PN10
	DN100...DN200: PN 16
	DN15...DN80: PN 25
	Other pressures on request
ASME B16.5	1/2" ...8": 150 lb RF
	Other pressures on request
JIS	1/2" ...8": 10 K
	Other pressures on request

Installation conditions

Installation	Take care that flow sensor is always fully filled
	For detailed information see chapter "Cautions for Installation"
Flow direction	Forward
	Arrow on flow sensor indicates flow direction.
Inlet run	≥ 10 DN
Outlet run	≥ 5 DN

Materials

Sensor housing	SS304
	Other materials on request
Flanges	SS304
	Other materials on request
Converter Housing	Standard: polyurethane coated die-cast aluminum

Process connections

Flange	
EN 1092-1	DN15...300 in PN 6...25
ASME	1/2" ...12" in 150 lb RF
JIS	1/2" ...12" in 10...20K
Design of gasket surface	RF
	Other sizes or pressure ratings on request
Wafer	DN15...DN300

Measurable Flow Rate Range:

Note: The flow range as blow is for reference only. Consult the factory if you have special requirement. Refer to the nameplate or certificate for actual flow range.

Flange/Wafer type

Nominal Diameter		Liquid	Gas
(mm)	(in.)	Flow (m3/h)	Flow (m3/h)
15	1/2"	1.2 to 6.2	5 to 25
20	3/4"	1.5 to 10	8 to 50
25	1"	1.6 to 16	10 to 70
40	1-1/2"	2.5 to 25	22 to 220
50	2"	3.5 to 35	36 to 320
65	2-1/2"	6.5 to 65	50 to 480
80	3"	10 to 100	70 to 640
100	4"	15 to 150	130 to 1100
125	5"	25 to 250	200 to 1700
150	6"	36 to 380	280 to 2240
200	8"	62 to 650	580 to 4960
250	10"	140 to 1400	970 to 8000
300	12"	200 to 2000	1380 to 11000

Insertion type

Nominal Diameter		Liquid	Gas
(mm)	(in.)	Flow (m3/h)	Flow (m3/h)
200	8"	70 to 700	600 to 6000
250	10"	110 to 1100	1060 to 10600
300	12"	180 to 1800	1500 to 15000
350	14"	210 to 2100	2000 to 20000
400	16"	270 to 2700	2700 to 27000
450	18"	350 to 3500	3300 to 33000
500	20"	450 to 4500	4200 to 42000
600	24"	600 to 6000	6100 to 61000
800	32"	800 to 8000	11000 to 110000
1000	40"	1200 to 12000	17000 to 170000
1200	48"	1800 to 18000	24000 to 240000
1500	60"	2600 to 26000	38000 to 380000

Pressure rating

DN	Inch	Standard Pressure	Max Pressure
15-100	1/2"- 4"	Flange:1.6MPa Wafer:2.5MPa	4.0MPa
125-300	5" - 12"	1.6MPa	4.0MPa
350-1500	14"- 60"	1.6MPa	

3. Model and Selection

Model Selection (See Table 1)

Table 1: Model Selection Guidance for Vortex Flowmeter

Model Suffix Code								Description
VTF	-							
Connection	1							Flange
	2							Wafer
	3							Insertion
Fluid	G							Gas
	L							Liquid
	S							Steam
Diameter							Three Digitals; for example: 010: 10 mm; 015: 15 mm; 080: 80 mm; 100: 100 mm	
Structure	Z							Compact Type
	F							Remote Type
Converter	N							No display; 24V DC; Pulse Output
	A							No display; 24V DC; 4-20mA Output
	B							Local display; Lithium Battery Power; No output
	C							Local display; 24V DC Power; 4-20mA Output; Optional backup power: Lithium Battery
	C1							Local display; 24V DC Power; 4-20mA Output; Modbus RS485 Communication Optional backup power: Lithium Battery
	D							Local display; 24V DC Power; 2-wire 4-20mA Output; Pulse Output Temperature and Pressure Compensation Refer to the photo on cover (Right One)
Explosion Rating	N							Safety Field without Explosion
	E							ExdIIBT6
Flange Standard	-DXX							DXX: D06, D10, D16, D25, D40 D06: DIN PN6; D10: DIN PN10 D16: DIN PN16; D25: DIN PN25 D40: DIN PN40
	-AX							AX: A1, A3, A6 A1: ANSI 150#; A3: ANSI 300# A6: ANSI 600#
	-JX							JX: J1, J2, J4 J1: JIS 10K; J2: JIS 20K; J4: JIS 40K
	-WF							Wafer Connection; Mating Flange included.
Fluid Temperature	-T1							-20...+70°C
	-T2							-20...+250°C
	-T3							-20...+350°C

Model Code: VTF-2S050ZCN-WF-T2

Explanation – Wafer Connection; Fluid: Steam; Diameter: 50mm; Compact Type; Converter: 24V DC Power Supply, 4-20mA Output, Local Display; No Explosion; Fluid Temperature: -20...+250°C