VNER

VORTEX FLOWMETER

MA80T SERIES

JIANGSU VNER ELECTRONIC TECHNOLOGY LTD

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VNER MA80T VORTEX FLOWMETER OVERVIEW

The MA80T series vortex flowmeter strictly follows the principle of reliability in its design, adopting an optimized design scheme with simplified structure. The entire series of product components achieve high universality and interchangeability; The circuit components use new components with high reliability indicators and adopt surface mount technology, eliminating low reliability components such as potentiometers and connectors, significantly improving the overall reliability indicators of the machine.

1. Rotatable meter head

2. Anti-interference

3. Easy maintenance

4. Intelligent modular design

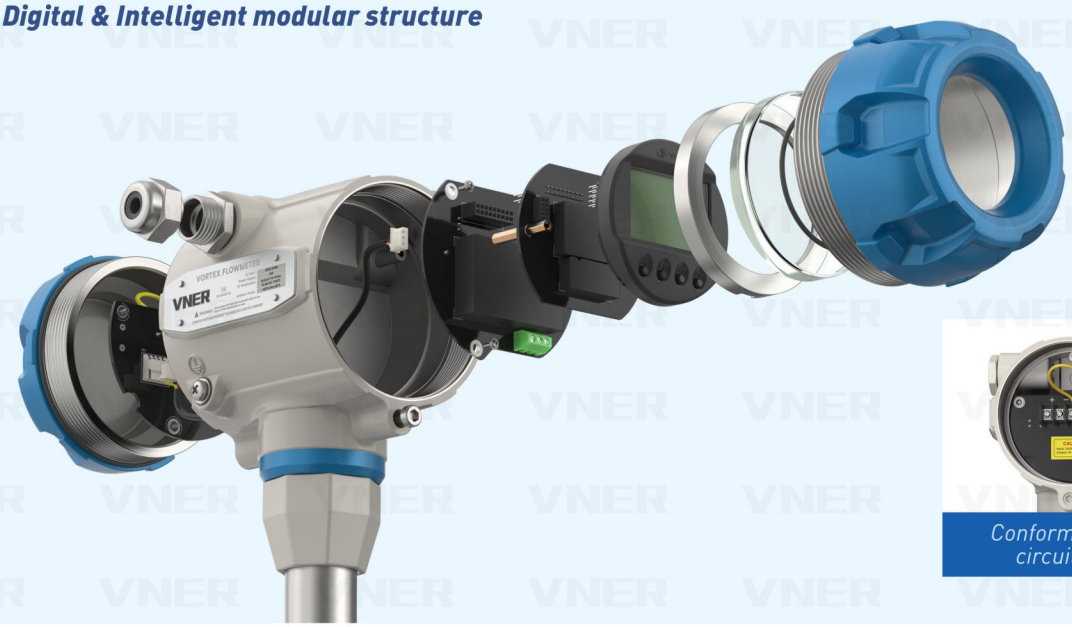
Rotatable Meter Tower

Removable Protection Covers

Easy-Maintenance Design

Eye-Catching Protection Paint

Digital & Intelligent modular structure



Conformal coated circuit board

PRODUCT DESCRIPTION

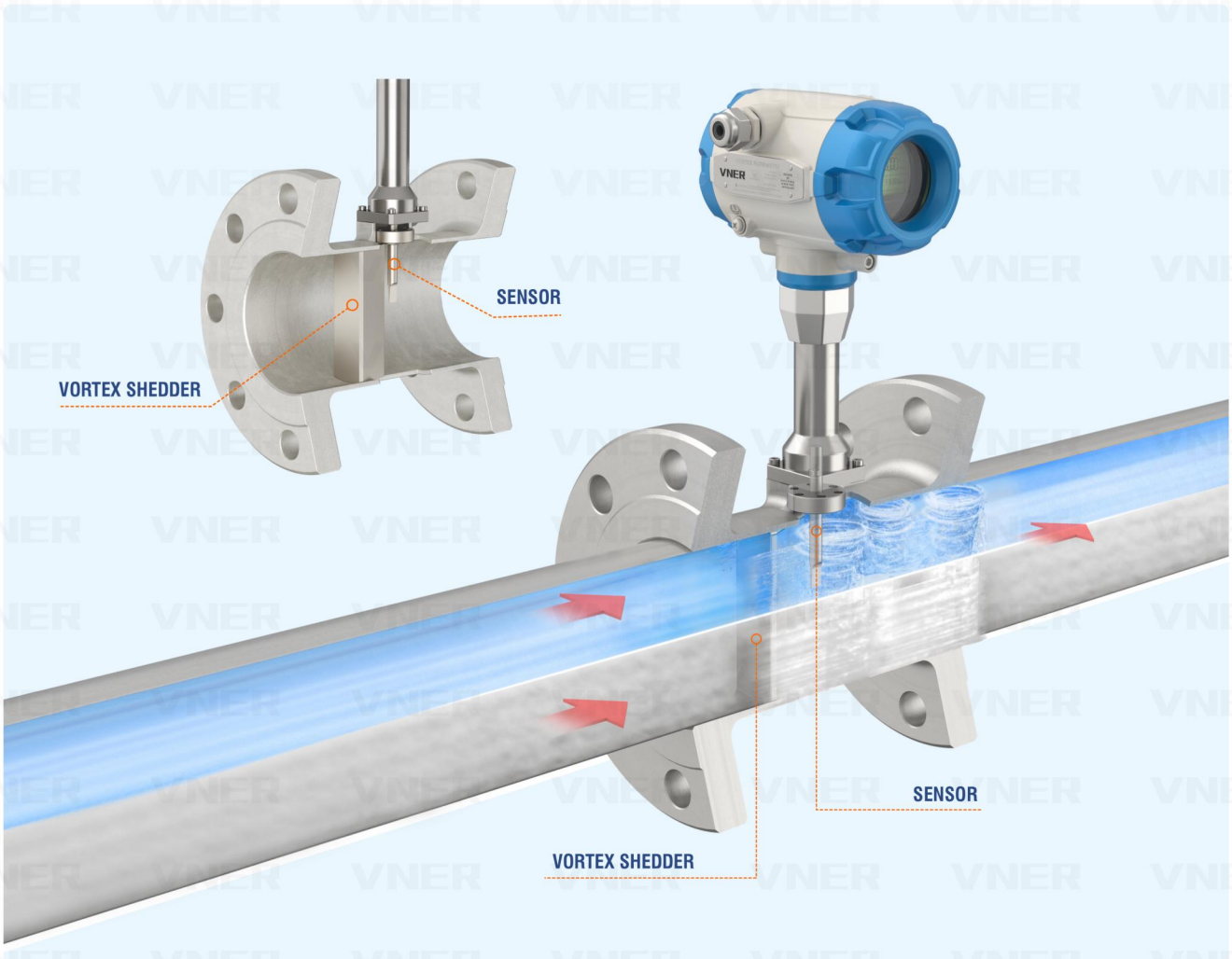
Vortex flowmeter is a kind of flowmeter applying Karman vortex principle, which is used to measure the flow of liquid, gas and steam, and also can be used to measure the disturbed liquid containing particles and impurities.It is widely used in petroleum, chemical, pharmaceutical, papermaking, metallurgy, electric power, environmental protection, food, pharmaceutical, papermaking, metallurgy, electric power, food and other industries.

MA80T series vortex flowmeter is designed in strict accordance with the principle of reliability, and adopts the optimized design scheme of structural simplification, and the components of the whole series of products achieve high universality and interchangeability; the circuit components are selected from the new components with high reliability indexes, and the surface mounting process is adopted, which eliminates the potentiometers, plug-ins and other low-reliability components, and the reliability index of the whole machine is significantly improved.

WORKING PRINCIPLE

SENSOR IN THE VORTEX FLOWMETER

A vortex meter is a type of volumetric flow meter that makes use of a natural phenomenon that occurs when a liquid flows around a bluff object. Vortex flow meters operate under the vortex shedding principle, where vortices are shed alternately downstream of the object.



MAIN TECHNICAL PARAMETERS

The main technical parameters of the MA80T series are listed in the table below:

Applicable Medium: Gas, Liquid, Saturated Steam, Superheated Steam

Available Connection: Flange, Wafer, Insertion

Nominal Diameter (mm): 15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600 other available upon request

Nominal Pressure (Mpa): **Liquid:** 1.0, 1.6, 2.5, 4.0, other pressure optional, maximum 30MPa
Gas and Steam: 1.0, 1.6, 2.5, 4.0, other pressure optional, maximum 30MPa

Medium Temperature (°C): **- 200°C ~ 160°C: C**ryogenic liquids and gases
- **40°C ~ 300°C: L**iquids, gases, saturated steam, superheated steam
- **40°C ~ 350°C: S**uperheated steam

Accuracy: Standard ≤1%, (≤0.75% available upon request)

Body and Wetted Material: 304, 316L, Hastelloy C (other materials available upon request)

Flow Range: **Liquid: 0.3 ~ 7 m/s**
Gas : 3~60 m/s
Steam: 3~70 m/s

Power Supply: 24V DC, 3.6V DC Battery powered

Signal Output: 4-20mA, Pulse

Communication Protocol: Modbus RS-485, HART

Explosion-Proof Marking: **Intrinsically Safe:** ExiaIICT4-T6 Ga; Ex iaD T135°C
Explosion-proof: Exd IC T6 Gb; Ex tD A21 IP66 T80°C

Ingress Protection: **Standard type IP65**
Submersible type IP68

Environmental Conditions: **Ambient Temperature:** - 40°C to + 55°C
Relative Humidity: 5% to 90%
Atmospheric Pressure: 86% to 106Kpa

INSTRUMENT SERIAL CODE DESCRIPTION

BASE MODEL: MA80T														
Transmitter Type:														
Integral Model	E													
Split Model	R													
Submersible Model	Q													
Output Signal:														
4-20mA Analog and Pulse		D												
Process Connection Type:														
Wafer Connection														
DIN HG 20592 Flange			0											
ANSI HG 20615 Flange			1											
Other Customization			2											
Measured Medium:			3											
250°C				1										
350°C				2										
400°C				3										
Housing Material:														
Stainless Steel 304					A									
Stainless Steel 316L					B									
Customization Available Upon Request					E									
Nominal Diameter:														
DN15						015								
DN20						020								
DN25						025								
DN32						032								
DN40						040								
DN50						050								
DN65						065								
DN80						080								
DN100						100								
DN125						125								
DN150						150								
DN200						200								
DN250						250								
DN300						300								
DN350						350								
DN400						400								
DN500						500								
DN600						600								

BASE MODEL: MA80T							
Nominal pressure:							
PN10	A						
PN16	B						
PN25	C						
PN40	D						
ANSI CLASS 150	F						
ANSI CLASS 300	G						
ANSI CLASS 600	H						
Customization Available (Max.15MPa)	E						
Piezo Sensor & Wetted Parts Material:							
Stainless Steel 304		1					
Stainless Steel 316		2					
Customization Available Upon Request		3					
On Request: Hastelloy		-					
On Request: Tantalum		-					
Piezo Sensor Sealing Material:							
Polytetrafluoroethylene (PTFE): (-40 to 150°C)			1				
Graphite O-Ring:(-200 to 280°C)			2				
Explosion Protection Certification:							
Without				A			
Explosion-Proof Exiall CT2-T6				B			
Explosion-Proof Exd IIB T6 Gb				G			
Electrical Interface:							
M20x1.5					1		
1/2 NPT(F)					2		
Communication Protocol:							
Without						A	
HART						H	
Modbus RS485						M	
Temperature and Pressure Compensation:							- T
Temperature Compensator							- P
Pressure Compensator							- TP
Temperature and Pressure Compensator							
Additional Information:							
Device Identification Plate/Certification and Tag Plate Available On Request							
Display Glass Cover Depends On Request and Preference							
Operating Handle Customization Please Consult Manufacturer							
Specifications On Parts and Components Please Consult Manufacturer							

MEASURING RANGE FOR GAS AND LIQUIDS

GAS MEASURING RANGE

VNER MA80T VORTEX FLOWMETER GAS FLOW MEASURING RANGE (UNDER REFERENCE CONDITIONS)					
Vales Based on Air: Temperature (t): 20°C / 68°F; Pressure (p): 0.1013 MPa / 14.7 Psi; Density (p): 1.205 kg/m³ / 0.0751 lb/ft³					
Nominal Pipe Size	Nominal Diameter DN Standard (mm)	Nominal Diameter ANSI Standard (in)	Designed Measuring Range (m^3/h)	Optional Measuring Range (m^3/h)	Signal Output Range Hz (m^3/h)
15 mm	15	1/2"	5 ~ 30	5 ~ 50	460 ~ 3700
20 mm	20	3/4"	6 ~ 50	6 ~ 60	220 ~ 3400
25 mm	25	1"	8 ~ 60	8 ~ 120	180 ~ 2700
32 mm	32	1 1/4"	14 ~ 100	14 ~ 150	130 ~ 1400
40 mm	40	1 1/2"	18 ~ 180	18 ~ 310	90 ~ 1550
50 mm	50	2"	30 ~ 300	30 ~ 480	80 ~ 1280
65 mm	65	2 1/2'	50 ~ 500	50 ~ 800	60 ~ 900
80 mm	80	3"	70 ~ 700	70 ~ 1230	40 ~ 700
100 mm	100	4"	100 ~ 1000	100 ~ 1920	30 ~ 570
125 mm	125	5"	150 ~ 1500	140 ~ 3000	23 ~ 490
150 mm	150	6"	200 ~ 2000	200 ~ 4000	18 ~ 360
200 mm	200	8"	400 ~ 4000	320 ~ 8000	13 ~ 325
250 mm	250	10"	600 ~ 8000	550 ~ 18500	11 ~ 220
300 mm	300	12"	1000 ~ 10000	800 ~ 20000	9 ~ 210
350 mm	350	14"	1500 ~ 15000	1100 ~ 24000	8 ~ 175
400 mm	400	16"	1800 ~ 18000	1500 ~ 30800	7 ~ 143
450 mm	450	18"	2100 ~ 21000	2000 ~ 35000	6 ~ 90
500 mm	500	20"	2500 ~ 25000	2000 ~ 48000	5 ~ 120
600 mm	600	24"	3200 ~ 32000	2500 ~ 70000	3.5 ~ 98

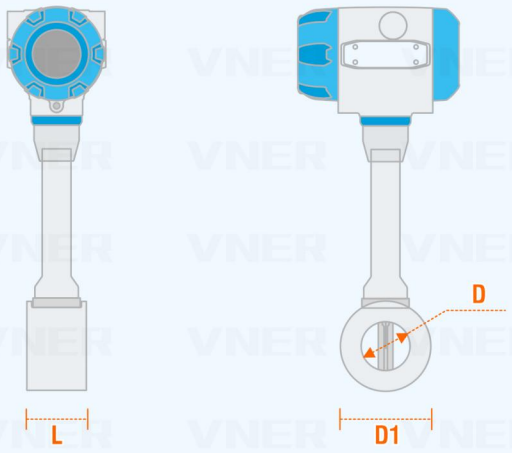
LIQUID MEASURING RANGE

VNER MA80T VORTEX FLOWMETER LIQUIDS FLOW MEASURING RANGE (UNDER REFERENCE CONDITIONS)					
Vales Based on Air: Temperature (t): 20°C / 68°F; Pressure (p): 0.1013 MPa / 14.7 Psi; Density (p): 1.205 kg/m³ / 0.0751 lb/ft³					
Nominal Pipe Size	Nominal Diameter DN Standard (mm)	Nominal Diameter ANSI Standard (in)	Designed Measuring Range (m^3/h)	Optional Measuring Range (m^3/h)	Signal Output Range Hz (m^3/h)
15 mm	15	1/2"	1 ~ 6	0.8 ~ 8	90 ~ 900
20 mm	20	3/4"	1.2 ~ 8	1 ~ 15	40 ~ 600
25 mm	25	1"	2 ~ 16	1.6 ~ 18	35 ~ 400
32 mm	32	1 1/4"	2.2 ~ 20	1.8 ~ 30	20 ~ 250
40 mm	40	1 1/2"	2.5 ~ 25	2 ~ 48	10 ~ 240
50 mm	50	2"	3.5 ~ 35	3 ~ 70	8 ~ 190
65 mm	65	2 1/2'	6~60	5 ~ 85	7 ~ 150
80 mm	80	3"	13 ~ 130	10 ~ 170	6 ~ 110
100 mm	100	4"	20 ~ 200	15 ~ 270	5 ~ 90
125 mm	125	5"	30 ~ 300	25 ~ 450	4.5 ~ 76
150 mm	150	6"	50 ~ 500	40 ~ 630	3.8 ~ 60
200 mm	200	8"	100 ~ 1000	80 ~ 1200	3.2 ~ 48
250 mm	250	10"	150 ~ 1500	120 ~ 1800	2.5 ~ 37.5
300 mm	300	12"	200 ~ 2000	180 ~ 2500	2.2 ~30.6
350 mm	350	14"	300 ~ 3000	220 ~ 3500	1.7 ~ 27
400 mm	400	16"	350 ~ 3500	300 ~ 4500	1.4 ~ 21
450 mm	450	18"	420 ~ 4200	400 ~ 6000	1.2 ~ 15
500 mm	500	20"	500 ~ 5000	400 ~ 7100	1.0 ~ 17.8
600 mm	600	24"	700 ~ 7000	500 ~ 10000	0.7 ~ 14

STEAM MEASURING RANGE

VNER MA80T VORTEX FLOWMETER STEAM FLOW MEASURING RANGE (UNDER REFERENCE CONDITIONS)					
Vales Based on Air: Temperature (t): 20°C / 68°F; Pressure (p): 0.1013 MPa / 14.7 Psi; Density (p): 1.205 kg/m³ / 0.0751 lb/ft³					
Nominal Pipe Size	Nominal Diameter DN Standard (mm)	Nominal Diameter ANSI Standard (in)	Minimum Measuring Range (kg/h)	Maximum Measuring Range (kg/h)	Extended Maximum Measuring Range (kg/h)
15 mm	15	1/2"	8.24 x √p	49.5 x √p	38.2 x p
20 mm	20	3/4"	9.88 x √p	79 x √p	67.8 x p
25 mm	25	1"	13.12 x √p	104 x √p	2106 x p
32 mm	32	1 1/4"	23 x √p	184 x √p	174 x p
40 mm	40	1 1/2"	26.65 x √p	265 x √p	271 x p
50 mm	50	2"	49.41 x √p	494 x √p	424 x p
65 mm	65	2 1/2'	82.35 x √p	823 x √p	716 x p
80 mm	80	3"	115.3 x √p	1153 x √p	1085 x p
100 mm	100	4"	164.7 x √p	1647 x √p	1696 x p
125 mm	125	5"	247.1 x √p	2471 x √p	2649 x p
150 mm	150	6"	329.4 x √p	3294 x √p	3815 × p
200 mm	200	8"	658.8 x √p	6588 x √p	6782 x p
250 mm	250	10"	988.2 x √p	9882 x √p	1.596 x p
300 mm	300	12"	1647 x √p	16470 x √p	15260 x p
350 mm	350	14"	2471 x √p	24710 x √p	20771 x p
400 mm	400	16"	2965 x √p	29650 x √p	27130 x p
450 mm	450	18"	3459 x √p	34590 x √p	34336 x p
500 mm	500	20"	4118 x √p	41180 x √p	42390 x p
600 mm	600	24"	5270 x √p	52700 x √p	61042 x p

DIMENSIONS FOR MA80 WAFER CONNECTION

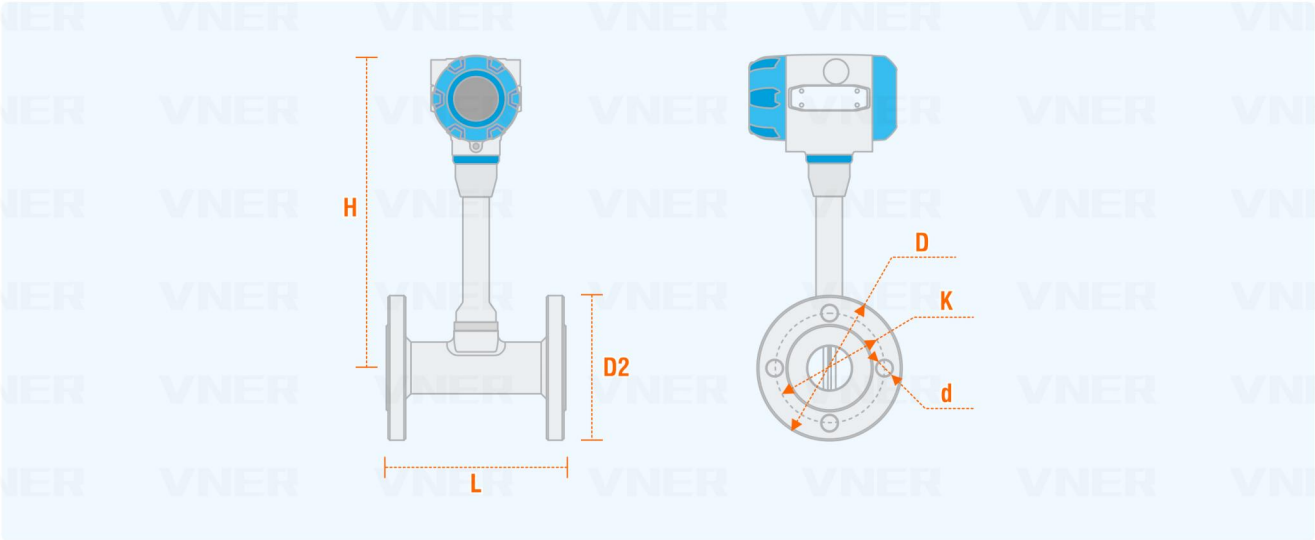


VNER MA80T VORTEX FLOWMETER-WAFER

Dimensions with Wafer Connection (PN 25)

Nominal Diameter	Inner Diameter (D)	Outer Diameter (D1)	Tube Length (L)	Flange Ring Diameter (D2)	Bolt Hole Centre Diameter (K)	Flange Thickness (C)	Bolt Hole Diameter (d)	Number of Bolts (n)	Thread Specification
15mm	15	65	15	120	85	14	14	4	M12
20mm	20	65	20	120	85	16	14	4	M12
25mm	25	65	25	135	100	16	14	4	M12
32mm	32	65	32	145	110	18	18	4	M16
40mm	40	65	40	150	110	18	18	4	M16
50mm	50	65	50	165	125	20	18	4	M16
65mm	65	70	65	185	145	22	18	8	M16
80mm	80	80	80	200	160	24	18	8	M16
100mm	100	100	100	235	190	26	22	8	M20
125mm	125	110	125	270	220	28	26	8	M24
150mm	150	120	150	300	250	30	26	8	M24
200mm	200	140	200	360	310	32	26	12	M24
250mm	250	140	250	425	370	35	30	12	M27
300mm	300	140	300	485	430	38	30	16	M27

DIMENSIONS FOR MA80 FLANGE CONNECTION



VNER MA80T VORTEX FLOWMETER-FLANGE									
Dimensions with Flange Connection (PN 25)									
Nominal Diameter	Inner Diameter (D)	Outer Diameter (D1)	Tube Length (L)	Bolt Hole Centre Diameter (K)	Flange Thickness (C)	Bolt Hole Diameter (d)	Number of Bolts (n)	Thread Specification	Meter Height (H)
15mm	15	95	200	65	14	14	4	M12	325 / 335
20mm	20	105	200	75	16	14	4	M12	328 / 338
25mm	25	115	200	85	16	14	4	M12	330 / 340
32mm	32	140	200	100	18	18	4	M16	318 / 328
40mm	40	150	200	110	18	18	4	M16	320 / 330
50mm	50	165	200	125	20	18	4	M16	325 / 335
65mm	65	185	200	145	22	18	8	M16	330 / 340
80mm	80	200	200	160	24	18	8	M16	335 / 345
100mm	100	235	250	190	26	22	8	M20	345 / 355
125mm	125	270	250	220	28	26	8	M24	360 / 370
150mm	150	300	300	250	30	26	8	M24	375 / 385
200mm	200	360	350	310	32	26	12	M24	420 / 430
250mm	250	425	450	370	35	30	12	M27	445 / 455
300mm	300	485	500	430	38	30	16	M27	475 / 485
350mm	350	555	600	490	42	33	16	M30	500 / 510
400mm	400	620	600	550	46	36	16	M33	525 / 535
450mm	450	670	600	600	50	36	20	M33	550 / 560
500mm	500	730	600	660	56	36	20	M33	575 / 585
600mm	600	845	600	770	68	39	20	M36	625 / 635

INSTALLATION

CAUTION

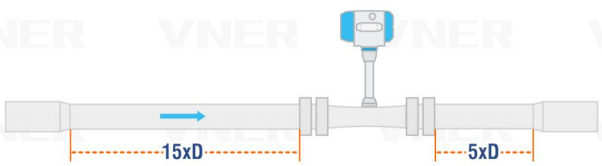
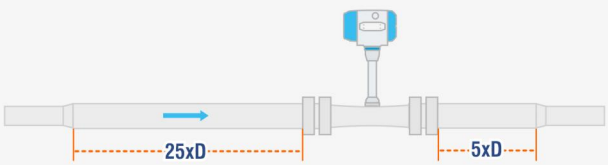
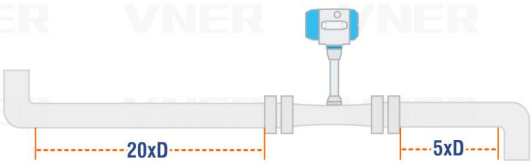
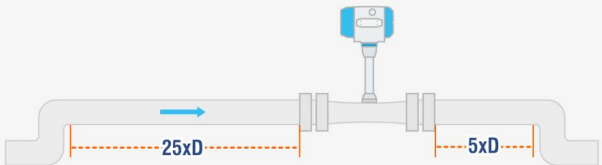
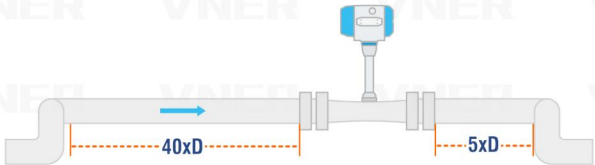
- Installation of the vortex flow meter must be performed by expert engineer or skilled personnel.
- Be careful that no damage is caused to people through accidentally dropping.
- When the vortex flow meter is processing with hot mediums like hot fluid or steam,be careful not to get burnt.
- All procedures relating to installation must comply with the installation requirements.
- Suggest to select an area subject to minimize mechanical vibration.If the flow meter is subject to vibrations,it is recommended to provide pipeline supports.
- No collision by hard subject,when the flow sensor is being installed otherwise the accuracy will be influenced,even the flow meter will be damaged.

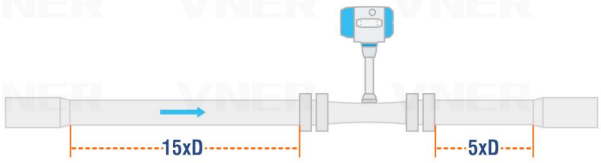
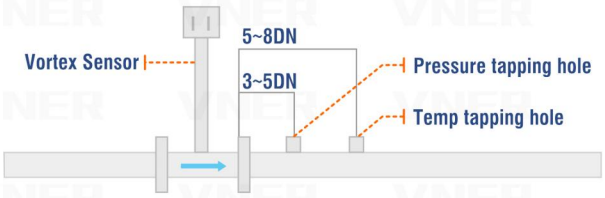
FLANGE/WAFER TYPE INSTALLATION

- **Installation Direction**

Horizontal or Vertical (The flow direction should always be upwards while vertical installation)

- **Straight Pipe Length Recommendation(D:Nominal Diameter mm)**

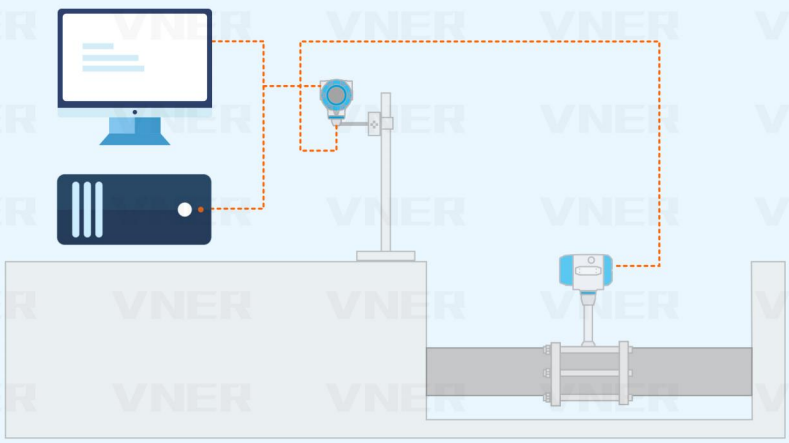
Description	Figure
Concentric reducers pipeline	
Concentric expansion pipeline	
Single quarter bend	
Two quarter bends on the same surface	
Two quarter bends on the different surface	

Description	Figure
Regulating valve,half-open gate	
Valve position	Flow regulating valve must be installed at the downstream of flow sensor.
Pressure and temperature taps(for remote type vortex flow meter with T&P compensation only) Remote type vortex flow meter with pressure and temperature compensation need to place pressure and temperature tap according to the requirement.Install pressure tapping point at3-5D downstream of flow sensorand temperaturetaking point at 5-8D downstream of flow sensor.	
Vibration Flow sensor should be not installed on a strong vibration pipeline	If install the flow sensor on a vibration pipeline,there are following methods to decrease the disturbing of vibration: Installinga fixed support on pipeline at 2D upstream of flow meter. At the condition of meeting the straight length,install ahosepipe as a transmission.
High temperature pipeline	If the heat preservation not good,the flow meter should be installed downward vertical.

If the length of upstream can not meet the requirement,suggest to install a flow regulator at the upstream pipeline.

REMOTE MODEL

The remote model vortex flowmeter is to separate the signal processing part (circuit board) and vortex sensor (flowmeter body) to adapt to the harsh installation environment, so as to facilitate the commissioning of the instrument. The maximum separation distance is 10 meters, see schematic diagram.



REMOTE VORTEX FLOWMETER INSTALLATION DIAGRAM

1) The vortex flowmeter can be installed indoors or outdoors. If installed in an underground well with the possibility of flooding, the submersible type should be selected.

2) Vortex flowmeter can be installed horizontally, vertically or inclined on the pipeline. When measuring liquids, the pipeline must be filled with liquid, so when installing vortex flowmeter on vertical or inclined pipeline, the flow direction of liquid should be from bottom to top.

3) vortex flowmeter upstream side and downstream side should leave a long straight section, the required length of the upstream and downstream straight section varies with the pipeline conditions.Vortex flowmeter upstream should try to avoid the installation of regulating valves or half-open valves, regulating valves or half-open valves should be installed downstream of the flowmeter after 5D.Different pipeline conditions, the installation requirements of straight pipe section

4) Installation of vortex flowmeter pipe diameter must be consistent with the inner diameter of the flowmeter, otherwise the pipe must be reduced in diameter, straight pipe section requirements

5) When designing piping installation, 500mm space should be left at the upper end of the signal processing converter to facilitate commissioning and maintenance.

MANUFACTURER'S INFORMATION

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JIANGSU VNER ELECTRONIC TECHNOLOGY LTD

We adapt to local regulations, we strive to deliver quality solutions and we are constantly trying to reduce our environmental impact.

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