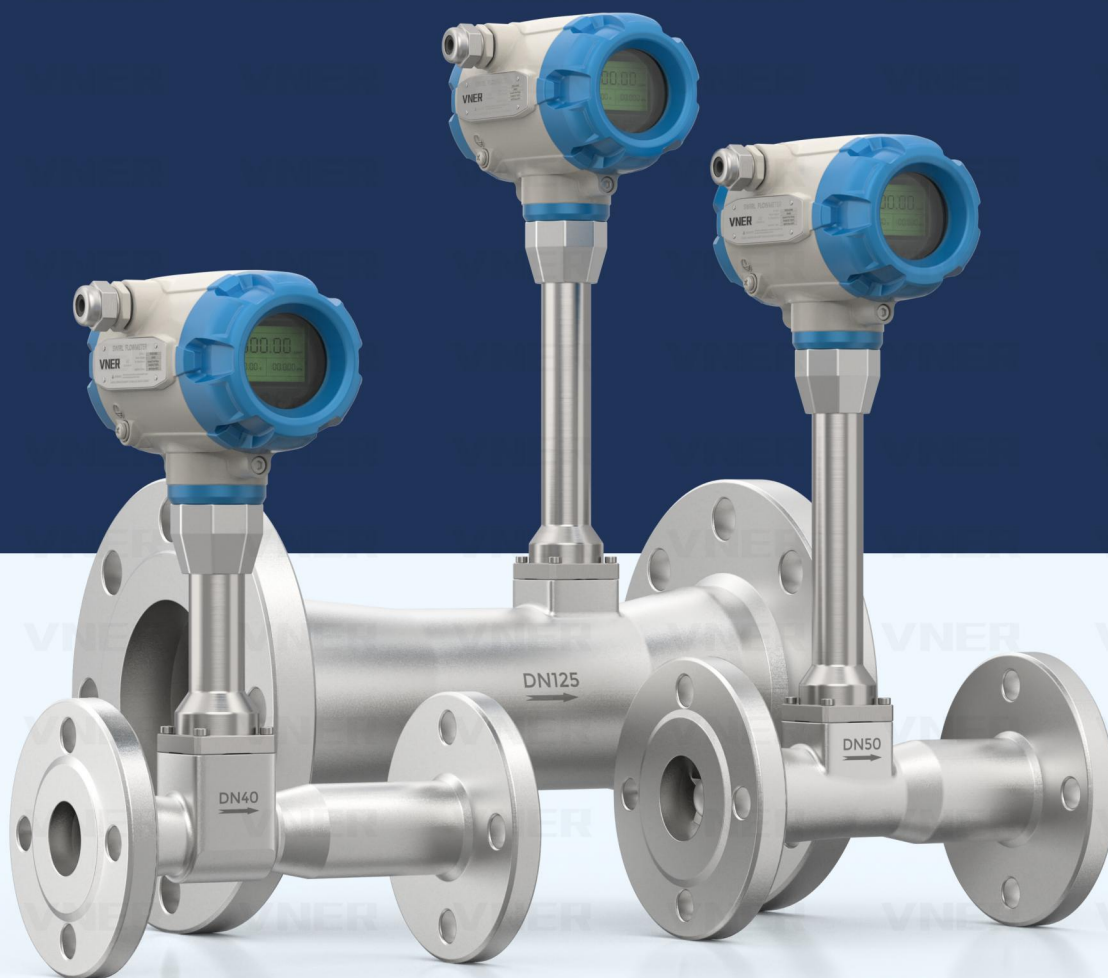


VNER

SWIRL FLOWMETER

SA80T SERIES



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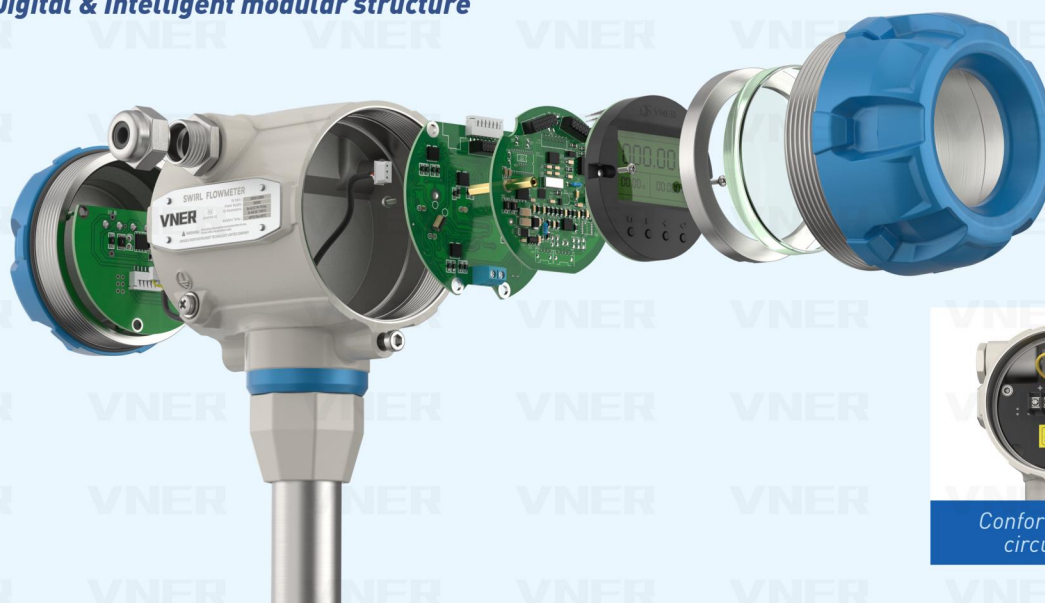
VNER SA80T SWIRL FLOWMETER OVERVIEW

The SA80T Enhanced Swirl flowmeter is a dependable device, designed with a simplified structure that is highly versatile and interchangeable. It utilizes digital signal processing, which enhances its anti-interference capabilities. The circuit module is assembled with components that meet higher reliability and durability standards, and the surface mount modular design eliminates low-reliability components such as potentiometers and plugs. This ensures that the flowmeter is highly stable and accurate.

1. Rotatable meter head
2. Anti-interference
3. Easy maintenance
4. Intelligent modular design



Digital & Intelligent modular structure



SWIRL FLOWMETER INTRODUCTION AND SCOPE OF APPLICATION

The swirl flowmeter is one of the major flow measurement instruments in the international market today. It is widely used in industrial sectors such as petroleum, chemical engineering, metallurgy, as well as in municipal construction and environmental protection projects. It measures, detects, and controls the flow of most liquids, gases, and steam.

The SA80T swirl vortex flowmeter is manufactured using the latest German technology and processes.

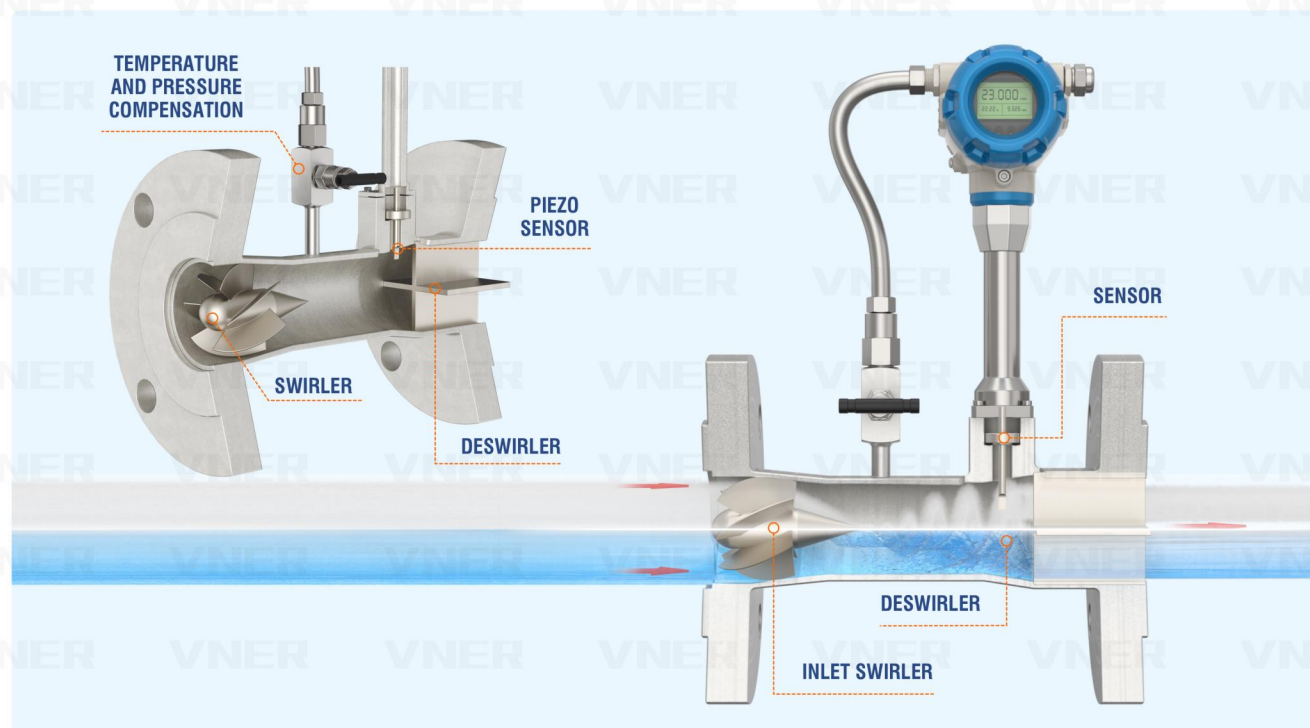
The product line includes the following variants with different functions:

- 1) The two-wire integral transmitter: Outputs a 4-20mA current signal and provides real-time display of instantaneous flow, cumulative flow, signal frequency, and output current value. It features low flow cut-off and fixed interference signal elimination functions.
- 2) Remote Type: Suitable for harsh environments such as high temperatures or high altitudes.

MAIN TECHNICAL PARAMETERS

The main technical parameters of the SA80T series are listed in the table below:

Applicable Medium	Gas, Liquid, Steam		
Nominal Diameter (mm):	15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400		
Nominal Pressure (Mpa)	PN series, ANSI series		
Medium Temperature	-40 to 250°C; custom configurations available for 350~400°C		
Body Material	304, 316L stainless steel (other materials available by agreement)		
Accuracy	Standard $\pm 1\%$, ($\pm 0.5\%$ available upon request)		
Turndown Ratio	1:15 to 1:30		
Output Signal	Transmitter: 4-20mA standard current signal proportional to flow		
Power Supply	24VDC		
Resistance Loss Coefficient	(Cd) < 5		
Explosion-Proof Marking	Exiall CT4-T6, ExdII CT4-T6		
Ingress Protection	Standard type IP65, Submersible type IP67/IP68		
Environmental Conditions	Ambient Temperature: -40 to +55°C	Relative Humidity: 5% to 90%	Atmospheric Pressure: 86% to 106Kpa



INSTRUMENT SERIAL CODE DESCRIPTION

SWIRL FLOWMETER									
Transmitter Type:									
Integral Model	E								
Remote model	R								
Submersible Model	C								
Digital Display and Power:									
On-Site LCD, 24 VDC System Power	D								
On-Site LCD, 3.6 VDC Battery Powered	B								
Process Connection Type:									
GB Flange		1							
DIN Flange		2							
ANSI Flange		3							
Measured Medium:									
Liquid			1						
Gas			2						
Saturated Steam, Overheated Steam < 350°C			3						
Body Material:									
Stainless Steel 304				A					
Stainless Steel 316L				B					
Carbon Steel				C					
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				
Nominal pressure:									
PN10					A				
PN16					B				
PN25					C				
PN40					D				
ANSI CLASS 150					F				
ANSI CLASS 300					G				

SWIRL FLOWMETER									
ANSI CLASS 600					H				
Customization Available (Max.15MPa)					E				
Piezo Sensor Material:									
Stainless Steel 304					1				
Stainless Steel 316					2				
Hastelloy C					3				
Hastelloy B					4				
Titanium					5				
Sealing Material:									
Polytetrafluoroethylene (PTFE): (-40 to 150°C)					1				
Graphite O-Ring: (-200 to 280°C)					2				
Metal Wrapped					3				
Explosion Protection Certification:									
Without						A			
Explosion-Proof ExiaII CT2-T6						B			
Explosion-Proof ExdII CT2 -T6						G			
Nominal Calibration Type:									
Standard: Manufacturer Calibration						1			
Designated Third-Party Calibration						9			
Electrical Connection:									
M20x1.5						1			
1/2 NPT(F)						2			
Communication Protocol:									
Standard							A		
HART							H		
RS485							M		
Cryogenic Piezo Sensor:									
								Z	
Temperature and Pressure Compensation:									
Temperature Compensation									- T
Pressure Compensation									- P
Temperature and Pressure Compensation									- TP
Natural Gas Specific									- NG
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 LIQUID

GAS MEASURING RANGE

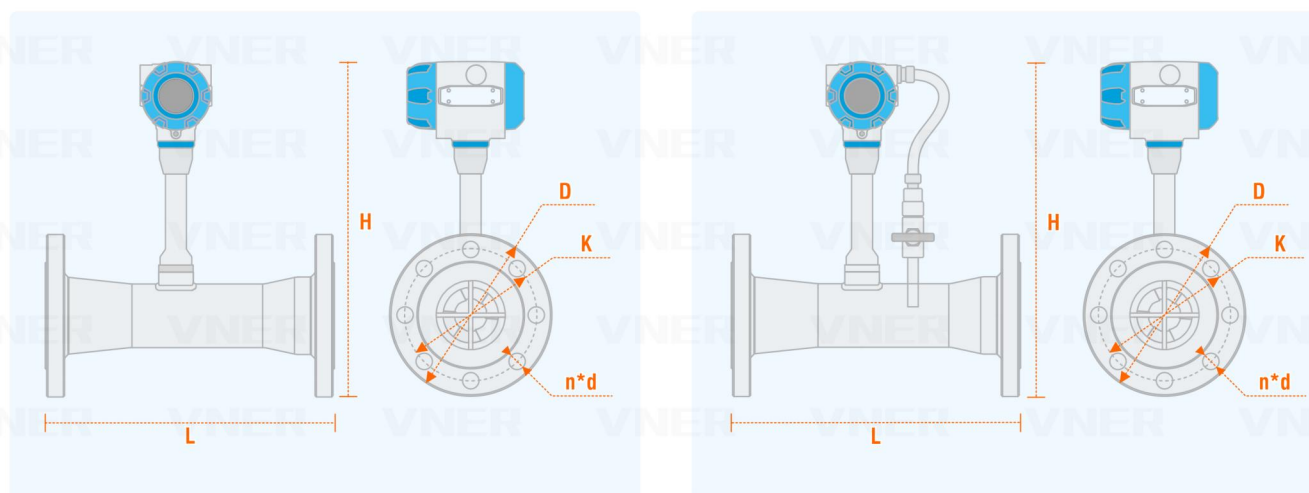
VNER SA80T SWIRL FLOWMETER GAS FLOW MEASURING RANGE (UNDER REFERENCE CONDITIONS)				
Values Based on Air: Temperature (t): 20°C / 68°F; Pressure (p): 0.1013 MPa / 14.7 Psi; Density (ρ): 1000 kg/m³ / 62.42 lb/ft³				
Nominal Pipe Size	Nominal Diameter DN Standard (mm)	Nominal Diameter ANSI Standard (in)	Minimum Flow Rate (m³/h)	Maximum Flow Rate (m³/h)
15 mm	15	1/2"	1	15
20 mm	20	3/4"	2	30
25 mm	25	1"	3	50
32 mm	32	1 1/4"	4	130
40 mm	40	1 1/2"	7	200
50 mm	50	2"	11	350
65 mm	65	2 1/2"	15	500
80 mm	80	3"	20	850
100 mm	100	4"	30	1500
125 mm	125	5"	45	2200
150 mm	150	6"	70	3600
200 mm	200	8"	120	5000
250 mm	250	10"	180	7000
300 mm	300	12"	250	10000
350 mm	350	14"	350	14000
400 mm	400	16"	450	20000

LIQUID MEASURING RANGE

VNER SA80T SWIRL FLOWMETER LIQUID MEASURING RANGE (UNDER REFERENCE CONDITIONS)				
Values Based on Water: Temperature (t): 20°C / 68°F; Pressure (p): 0.1013 MPa / 14.7 Psi; Density (ρ): 1000 kg/m³ / 62.42 lb/ft³				
Nominal Pipe Size	Nominal Diameter DN Standard (mm)	Nominal Diameter ANSI Standard (in)	Minimum Flow Rate (m³/h)	Maximum Flow Rate (m³/h)
15 mm	15	1/2"	0.15	1.5
20 mm	20	3/4"	0.2	2
25 mm	25	1"	0.4	6
32 mm	32	1 1/4"	0.8	10
40 mm	40	1 1/2"	1.6	16
50 mm	50	2"	2.5	25
65 mm	65	2 1/2"	3.5	60
80 mm	80	3"	5	100
100 mm	100	4"	7.5	150
125 mm	125	5"	10	250
150 mm	150	6"	18	370
200 mm	200	8"	35	500
250 mm	250	10"	60	800
300 mm	300	12"	100	1000
350 mm	350	14"	130	1300
400 mm	400	16"	180	1800

INSTALLATION DIMENSIONS

SWIRL FLOWMETER DIMENSIONS



DIMENSIONS FOR DIN STANDARD

SA80T Swirl FlowMeter- PN 1.6 MPa											
Dimensions for DIN standard flange											
Nominal Diameter (mm)	Outer Diameter (D)	Bolt Hole Centre Diameter (K)	Bolt Hole Diameter (L)	Bolt Number	Bolt Thread Spec	Sealing Gasket Flange (d)	Mount (f)	Flange Thickness (C)	Flange Inner Diameter (B)	Tube Length (L)	Weight (KG)
15	95	65	14	4	M12	45	2	14	22.5	200	2
20	105	75	14	4	M12	58	2	16	27.5	200	2.1
25	115	85	14	4	M12	68	2	16	34.5	200	3.4
32	140	100	18	4	M16	78	2	18	43.5	200	3.7
40	150	110	18	4	M16	88	2	18	49.5	250	6.8
50	165	125	18	4	M16	102	2	19	61.5	250	7.1
65	185	145	18	8	M16	122	2	20	77.5	300	9
80	200	160	18	8	M16	138	2	20	90.5	330	11.7
100	220	180	18	8	M16	158	2	22	116	410	17
125	250	210	18	8	M16	188	2	22	143.5	410	23
150	285	240	22	8	M20	212	2	24	170.5	580	29
200	340	295	22	12	M20	268	2	26	221.5	600	43
250	405	355	26	12	M24	320	2	29	276.5	800	105
300	460	410	26	12	M24	378	2	32	328	1000	173
350	520	470	26	16	M24	428	2	35	360	1100	209
400	580	525	40	16	M27	490	2	38	411	1270	247

SA80T Swirl FlowMeter- PN 2.5 MPa

Dimensions for DIN standard flange

Nominal Diameter (mm)	Outer Diameter (D)	Bolt Hole Centre Diameter (K)	Bolt Hole Diameter (L)	Bolt		Sealing Gasket		Flange Thickness (C)	Flange Inner Diameter (B)	Tube Length (L)	Weight (KG)
				Number	Thread Spec	Flange (d)	Mount (f)				
15	95	65	14	4	M12	45	2	14	22.5	200	2
20	105	75	14	4	M12	58	2	16	27.5	200	2.1
25	115	85	14	4	M12	68	2	16	34.5	200	3.4
32	140	100	18	4	M16	78	2	18	43.5	200	3.7
40	150	110	18	4	M16	88	2	18	49.5	250	6.8
50	165	125	18	4	M16	102	2	19	61.5	250	7.1
65	185	145	18	8	M16	122	2	20	77.5	300	9
80	200	160	18	8	M16	138	2	20	90.5	330	11.7
100	220	180	18	8	M16	158	2	22	116	410	17
125	250	210	18	8	M16	188	2	22	143.5	410	23
150	285	240	22	8	M20	212	2	24	170.5	580	29
200	360	310	26	12	M24	274	2	32	222	600	59
250	425	370	30	12	M27	330	2	35	276	800	130
300	485	430	30	16	M27	389	2	38	328	1000	200
350	555	490	33	16	M30	448	2	42	384	1100	250
400	620	550	36	16	M33	503	2	46	430	1270	300

SA80T Swirl FlowMeter- PN 4.0 MPa

Dimensions for DIN standard flange

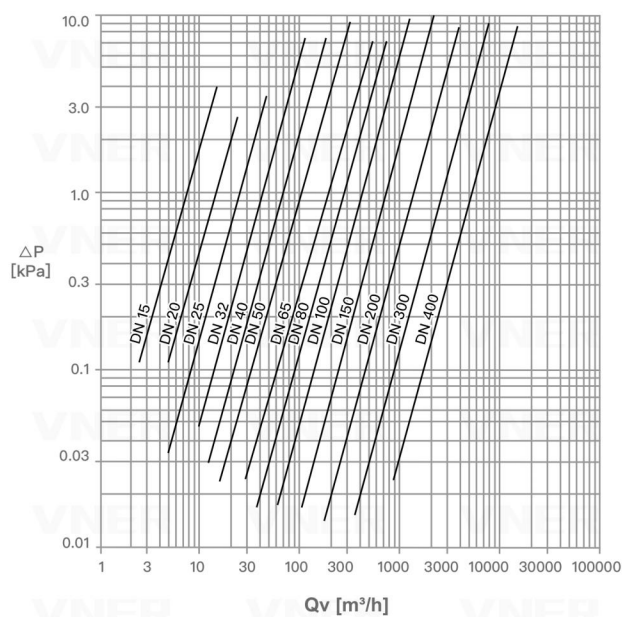
Nominal Diameter (mm)	Outer Diameter (D)	Bolt Hole Centre Diameter (K)	Bolt Hole Diameter (L)	Bolt		Sealing Gasket		Flange Thickness (C)	Flange Inner Diameter (B)	Tube Length (L)	Weight (KG)
				Number	Thread Spec	Flange (d)	Mount (f)				
15	15	65	14	4	M12	45	2	14	19	200	3
20	20	75	14	4	M12	58	2	16	26	200	3.2
25	25	85	14	4	M12	68	2	16	33	200	3.5
32	32	100	18	4	M16	78	2	18	39	200	4.7
40	40	110	18	4	M16	88	2	18	46	250	7
50	50	125	18	4	M16	102	2	20	59	250	7.2
65	65	145	18	8	M16	122	2	22	78	300	9.5
80	80	160	18	8	M16	138	2	24	91	330	12
100	100	190	22	8	M20	158	2	26	110	410	18
125	125	220	26	8	M24	188	2	28	135	410	28
150	150	250	26	8	M24	212	2	30	161	580	35
200	200	320	30	12	M27	268	2	36	222	600	66
250	250	385	33	12	M30	320	2	42	276	800	150
300	300	450	33	16	M30	378	2	48	328	1000	200
350	350	510	36	16	M33	428	2	55	380	1100	280
400	400	585	39	16	M36	490	2	60	430	1270	350

DIMENSIONS FOR ANSI STANDARD

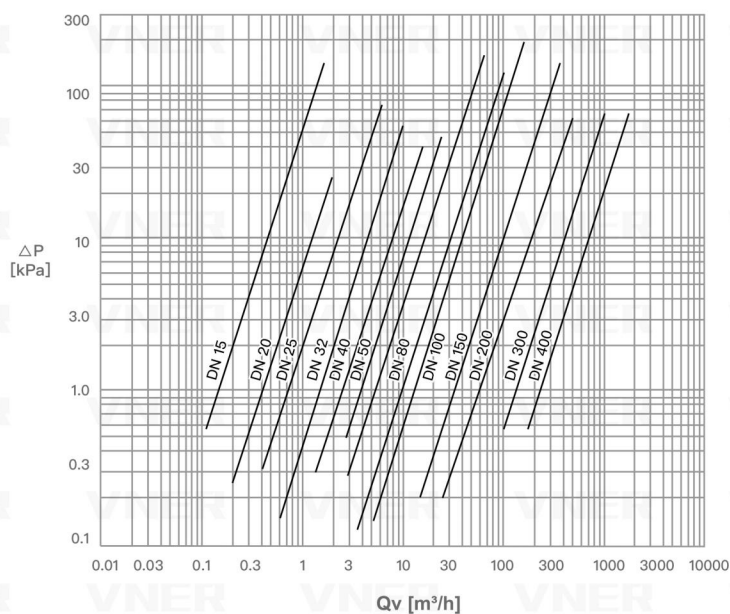
SA80T Swirl Flowmeter - Class 150 lbs (PN 2.0 MPa)												
Dimensions for ANSI B16.5 standard												
Nominal Diameter (mm)	Nominal Diameter ANSI B16.5 (in)	Outer Diameter (D)	Bolt Hole Centre Diameter (K)	Bolt Hole Diameter (L)	Bolt Number	Bolt Thread Spec	Sealing Gasket Flange (d)	Mount (f)	Flange Thickness (C)	Flange Inner Diameter (B)	Tube Length (L)	Weight (KG)
15	1/2"	90	60.3	16	4	M14	34.9	2	9.6	22.5	200	2
20	3/4"	100	69.9	16	4	M14	42.9	2	11.2	27.5	200	2.1
25	1"	110	79.4	16	4	M14	50.8	2	12.7	34.5	200	3.4
32	1 1/4"	115	88.9	16	4	M14	63.5	2	14.3	43.5	200	3.7
40	1 1/2"	125	98.4	16	4	M14	73	2	15.9	49.5	250	6.8
50	2"	150	120.7	18	4	M16	92.1	2	17.5	61.5	250	7.1
65	2 1/2"	180	139.7	18	4	M16	104.8	2	20.7	77.6	300	9
80	3"	190	152.4	18	4	M16	127	2	22.3	90.5	330	11.7
100	4"	230	190.5	18	8	M16	157.2	2	22.3	116	410	18
125	5"	255	215.9	22	8	M20	185.7	2	22.3	143.5	410	24
150	6"	280	241.3	22	8	M20	215.9	2	23.9	170.5	580	30
200	8"	345	298.5	22	8	M20	269.9	2	27	221.5	600	45
250	10"	405	362	26	12	M24	323.8	2	28.6	276.5	800	110
300	12"	485	431.8	26	12	M24	381	2	30.2	328	1000	182
350	14"	535	476.3	30	12	M27	412.8	2	33.4	360	1100	220
400	16"	595	539.8	30	16	M27	469.9	2	35	411	1270	260

SA80T Swirl Flowmeter - Class 300 lbs (PN 5.0 MPa)												
Dimensions for ANSI B16.5 standard												
Nominal Diameter (mm)	Nominal Diameter ANSI B16.5 (in)	Outer Diameter (D)	Bolt Hole Centre Diameter (K)	Bolt Hole Diameter (L)	Bolt Number	Bolt Thread Spec	Sealing Gasket Flange (d)	Mount (f)	Flange Thickness (C)	Flange Inner Diameter (B)	Tube Length (L)	Weight (KG)
15	1/2"	95	66.7	16	4	M14	34.9	2	12.7	22.5	200	3
20	3/4"	115	82.6	18	4	M16	42.9	2	14.3	27.5	200	3.2
25	1"	125	88.9	18	4	M16	50.8	2	15.9	34.5	200	3.6
32	1 1/4"	135	98.4	18	4	M16	63.5	2	17.5	43.5	200	5.4
40	1 1/2"	155	114.3	18	4	M16	73	2	19.1	49.5	250	8.9
50	2"	165	127	22	8	M20	92.1	2	20.7	61.5	250	9.8
65	2 1/2"	190	149.2	22	8	M20	104.8	2	23.9	77.6	300	13
80	3"	210	168.3	22	8	M20	127	2	27	90.5	330	16.2
100	4"	255	200	22	8	M20	157.2	2	30.2	116	410	27.5
125	5"	280	235	22	8	M20	185.7	2	33.4	143.5	410	36
150	6"	320	269.9	22	12	M20	215.9	2	35	170.5	580	46
200	8"	380	330.2	26	12	M24	269.9	2	39.7	221.5	600	75
250	10"	445	387.4	30	16	M27	323.8	2	46.1	276.5	800	120
300	12"	520	450.8	33	16	M30	381	2	49.3	328	1000	200
350	14"	585	514.4	33	20	M30	412.8	2	52.4	360	1100	280
400	16"	650	571.5	36	20	M33	469.9	2	55.6	411	1270	360

PRESSURE DROP FIGURES FOR GAS AND LIQUID



PRESSURE DROP FIGURE FOR GAS MEASUREMENT

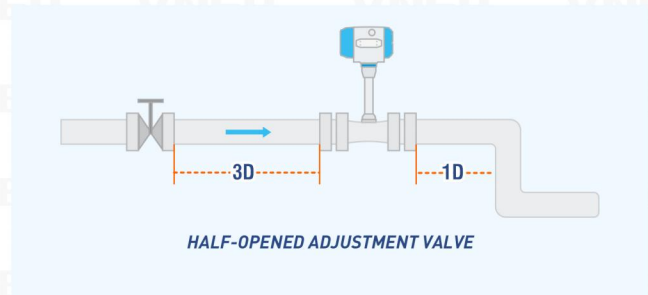
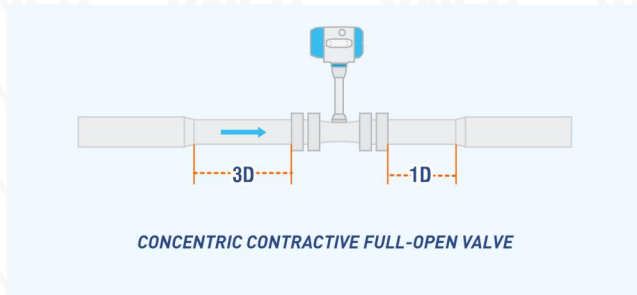
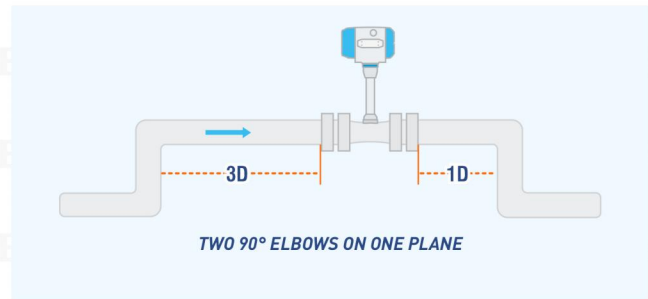
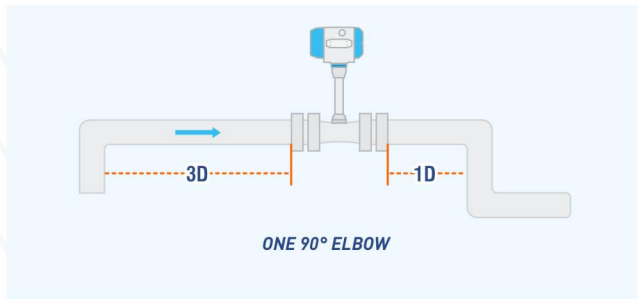
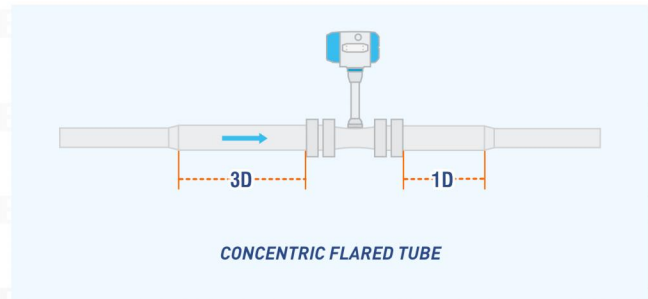
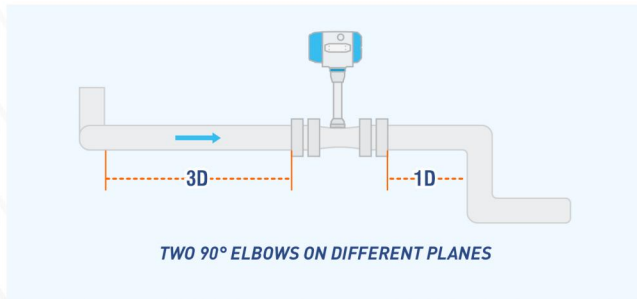


PRESSURE DROP FIGURE FOR LIQUID MEASUREMENT

INSTALLATION CONDITIONS

- The swirl flow meter can be installed indoors or outdoors. If installed in an underground well and there is a possibility of flooding, the submersible type should be selected.
- The swirl flow meter can be installed horizontally, vertically or inclined in the pipeline. When the measuring medium is liquid, then the pipe must be filled with liquid. Therefore, when installing swirl flow meter on vertical or inclined pipeline, the flow direction of liquid should be from bottom to top.
- Swirl flowmeter does not require a long straight pipe section, and the required length of the upper and lower straight pipe sections depends on the condition of the pipe. The upper end of the swirl flow meter should avoid installing a regulator or half-open valve as much as possible, and should be installed 5D after the lower end of the flow meter.
- In the design of the pipeline installation, the upper end of the flowmeter signal converter should be left 500mm space, to facilitate commissioning and maintenance.
- When the flowmeter requires a temperature-pressure compensation type, the pressure transmitter is installed at (1-2) D downstream of the flowmeter, and the temperature measuring element (usually with platinum resistance) is installed downstream (3-5) D.

GENERAL UPSTREAM AND DOWNSTREAM PIPE SECTIONS



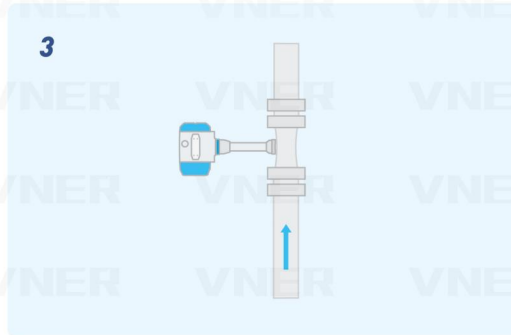
INSTALLATION POSITIONING

BASIC INSTALLATION REQUIREMENTS

- 1) The flowmeter can be installed indoors or outdoors, with an ambient temperature range of -20°C to $+55^{\circ}\text{C}$.
- 2) When the temperature of the measured medium exceeds 150°C , the display head can be installed horizontally or vertically downward (see Figure 1). Alternatively, a remote type can be selected, which is also suitable for harsh environments such as high altitudes or underground (see Figure 2). The maximum extension distance is 10 meters.



- 3) When measuring liquids and the flowmeter is installed on a vertical or inclined pipeline, the liquid flow direction should be from bottom to top (see Figure 3).



- 4) To facilitate commissioning, disassembly, and on-site maintenance of the flowmeter, there should be at least 0.5 meters of clear space above the display head (see Figure 4). If this cannot be ensured, the installation angle should be adjusted during installation.

- 5) It is advisable to avoid installing control valves or partially open valves upstream of the flowmeter. If required by the process, they can be installed downstream of the flowmeter at a distance of $5D$ (see Figure 5).



6) Signal Transmission Distance: The maximum transmission distance for the current output signal is 800 meters.

7) If the swirl flowmeter is installed on a pipeline with significant vibration, a flexible connection pipe should be added, or the pipeline should be secured (see Figure 6).

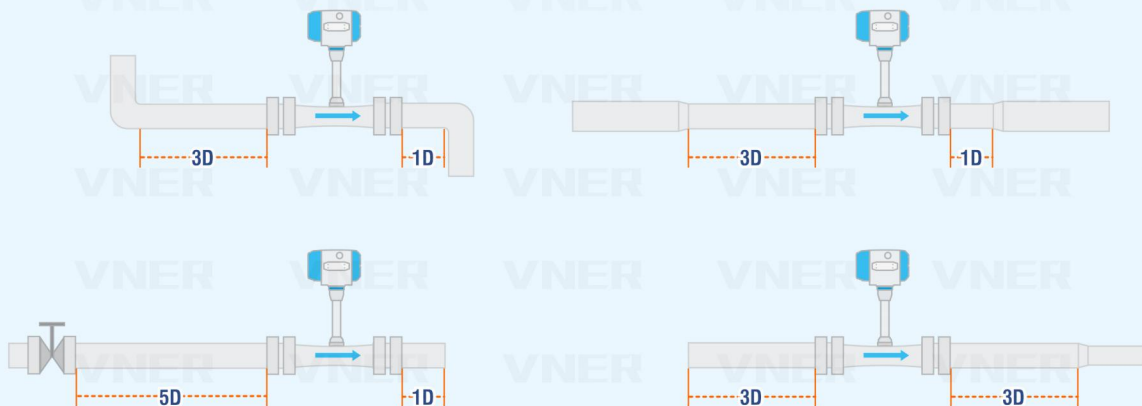
6



8) When measuring gas or steam, the swirl flowmeter should be installed at a high point in the pipeline to avoid condensate accumulating in low points. If installed at a low point, a drain valve should be added. When measuring liquids, the flowmeter should be installed at a low point in the pipeline to ensure full-pipe measurement.

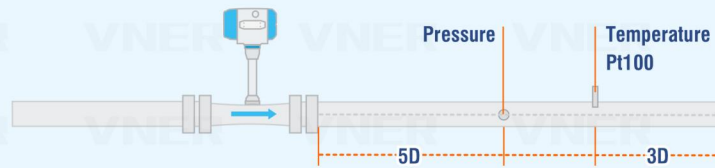
9) Sufficient straight pipe sections should be reserved upstream and downstream of the flowmeter. The recommended lengths of the straight pipe sections are shown in Figure 7. D is the nominal diameter of the instrument in mm

7



INSTALLATION FOR EXTERNAL TEMPERATURE AND PRESSURE MEASUREMENT

8



- 1) The temperature sensor (PT100) should be installed by drilling a hole ($\varnothing 25$ diameter) 5D downstream of the flowmeter. Weld the base in place and tighten the temperature sensor.
- 2) The pressure transmitter should take pressure from the pressure tapping point (1/4" NPT) on the lower side of the flowmeter or from a point 3D downstream of the flowmeter.

ISSUES TO NOTE DURING INSTALLATION:

- 1) Pay attention to the flow direction arrow on the flowmeter body; it should be aligned with the direction of the medium flow.
- 2) The inner diameter of the gaskets on both sides of the flowmeter should not be smaller than the inner diameter of the flowmeter body.
- 3) Pay special attention to the alignment of the flanged flowmeter with the pipeline.
- 4) During flange welding, the flowmeter should be removed to avoid damaging the sensor probe due to excessive welding temperatures.

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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