

# S-VTX SMART LINE Series

## Vortex flowmeters



### Applications

- Liquids, gases, and steam
- Industrial service gases
- Chemical and petrochemical industry
- Compressed air
- Pharmaceutical industry
- Food and drinks
- Waterworks

### Features and Benefits

- Flanged, wafer, clamp and insertion versions
- Temperature compensated versions
- Precision 1%
- CD coefficient > 2.4
- Temperature -40 ... 350 °C



# S-VTX

## EXTREMELY CONVENIENT FLOW MEASURE FOR PROCESS AND SERVICE APPLICATIONS

The Vortex flowmeters of the SMERI's Smart Line family are used in many industries to detect the flow rate of liquids, gases, and steam. They are suitable for very viscous fluids for which fluid filtration is required.

The working principle of the S-VTX meters is based on Karman's law, which studied and codified the vortex formation in moving fluids. The swirls are formed downstream of a suitable shaped body installed in the flow of the pipeline. The frequency of vortex formation depends exclusively on the speed of the fluid; consequently, by measuring the frequency, the flow rate can be calculated.

### VERSIONS

- Flowmeter with flanged connection
- Flowmeter with wafer connection
- Flowmeter with sanitary clamp
- Insertion flowmeter
- Temperature-pressure compensated flowmeter

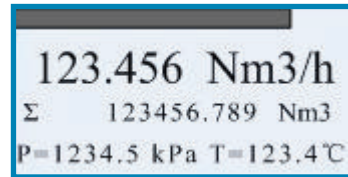
### TECHNICAL DATA

Measured medium	Liquid, gas, steam, single-phase medium
Accuracy	Better than $\pm 1\%$ (flange); 1.5% (insertion)
Medium temperature	-40...250 °C; -40...280 °C; 40...350 °C
Nominal pressure	1.6 MPa; 2.5 MPa; 4.0 MPa; 6.4 MPa; other on request
Turn down	1:8 ... 1:30 (standard reference conditions) 1: 8 ... 40 (standard reference conditions)
Flow range	Liquid 0,4...7,0 m/s; gas 4,0...60,0 m/s; vapour 5,0...70,0 m/s
Pipe specification	DN15-DN3000 (flange); DN80-DN2000 (insertion); DN15-DN100 (thread), DN15-DN300 (wafer); DN15-DN100 (sanitary)
Material	SS304 (standard); SS316 (in option)
Resistance coefficient	$C_d \leq 2,6$
Vibration acceleration	$\leq 0,2$ g
Protection degree	IP65, ATEX II IG Ex ia IIC T% Ga
Ambient conditions	Ambient temperature -40...65 °C (non Ex area); -20...55 °C (Ex area) Relative humidity $\leq 5...93\%$ Pressure 86-106 kPa
Power supply	12 (pulse) - 24 VDC (current) or 3.6 V battery powered
Signal output	Pulse, frequency signal 2-3000 Hz, Low level $\leq 1$ V; High level $\geq 6$ V Two-wire, 4-20 mA signal (isolated output). Load $\leq 500$

Temperature-pressure compensated flowmeter



### Example of the LCD display



Progress bar (percentage)

Instant flow

Total flow / totalized flow

Possible indications: frequency, density, pressure, temperature, current or percentage



### FLOW RANGE FOR LIQUID AND GAS

Size(mm)	Water	Normal pressure and temperature air(NPT Air)
	standard measuring range(m <sup>3</sup> /h)	standard measuring range(m <sup>3</sup> /h)
25	1.3~13	8~60
32	1.5~15	14~100
40	3~30	18~180
50	4~40	30~300
65	6~60	50~500
80	13~130	70~700
100	20~200	100~1000
125	36~360	150~1500
150	50~500	200~2000
200	100~1000	400~4000
250	150~1500	600~6000
300	200~2000	1000~10000



## FLOW RANGE FOR SATURATED STEAM (kg/h)

Table: Saturated steam Mass flow range (kg/h)															
Absolute pressure Mpa	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	
Temperature (°C)	120.2	133.5	143.62	151.84	164.96	164.96	170.41	175.36	179.68	187.96	195.04	201.37	207.11	212.37	
Density (kg/m <sup>3</sup> )	1.129	1.651	2.163	2.669	3.667	3.667	4.162	4.665	5.147	6.127	7.106	8.085	9.065	10.05	
DN20	Qmax	80	102	130	160	190	220	250	279	309	368	426	485	544	603
	Qmin	9	11	12	13	15	16	17	18	19	20	22	24	25	26
DN25	Qmax	136	198	260	320	380	440	499	559	618	735	853	970	1088	1206
	Qmin	14	17	19	21	23	25	27	28	30	33	35	37	39	42
DN40	Qmax	400	498	649	801	951	1100	1249	1397	1544	1838	2132	2426	2720	3015
	Qmin	32	38	44	48	53	57	60	64	67	73	79	84	89	94
DN50	Qmax	667	826	1080	1335	1585	1834	2081	2328	2574	3054	3553	4043	4533	5025
	Qmin	52	64	73	81	88	95	100	107	112	122	132	140	149	157
DN65	Qmax	933	1320	1730	2135	2536	2934	3330	3724	4118	4902	5685	6468	7252	8040
	Qmin	88	106	121	135	147	158	168	178	187	204	220	234	248	261
DN80	Qmax	1400	1980	2596	3240	4015	4644	5270	5896	6520	7760	9000	10240	11480	12730
	Qmin	105	127	145	161	176	189	201	213	224	345	263	280	298	313
DN100	Qmax	2332	3300	4320	5400	6430	7320	8320	9310	10300	12260	14200	16160	19120	20100
	Qmin	175	212	242	269	293	315	336	335	374	408	439	468	496	522
DN125	Qmax	3500	4950	6490	8000	9510	11000	12500	14000	15440	18400	21300	24260	27200	30200
	Qmin	262	317	363	404	440	473	504	533	560	611	658	702	744	783
DN150	Qmax	4666	6600	8650	10680	12680	14670	16650	18620	20590	24500	28420	32340	36260	40200
	Qmin	350	423	484	538	586	631	672	711	747	815	878	936	990	1044
DN200	Qmax	9330	13200	17300	21360	25360	29340	33300	37240	41180	47000	56850	64680	72520	80400
	Qmin	610	740	848	942	1026	1104	1176	1243	1308	1427	1536	1638	1735	1827
DN250	Qmax	13997	19810	25960	32030	38040	44000	49940	55860	61760	73520	85270	97000	108780	120600
	Qmin	875	1056	1210	1345	1466	1577	1680	1776	1868	2038	2195	2340	2480	2610
DN300	Qmax	20995	29720	38930	48040	57050	66000	74900	83800	92650	110300	127900	145530	163200	180900
	Qmin	1050	1270	1453	1614	1759	1892	2016	2132	2241	2446	2634	2808	2975	3132

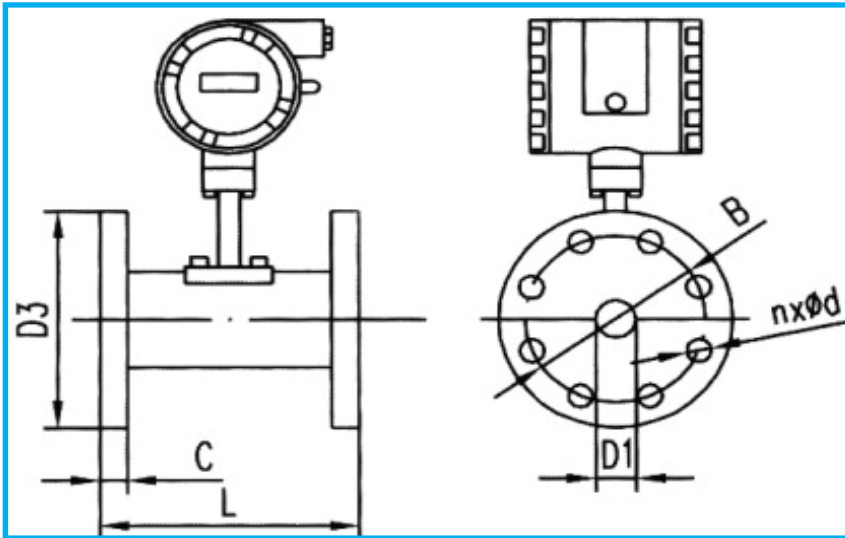
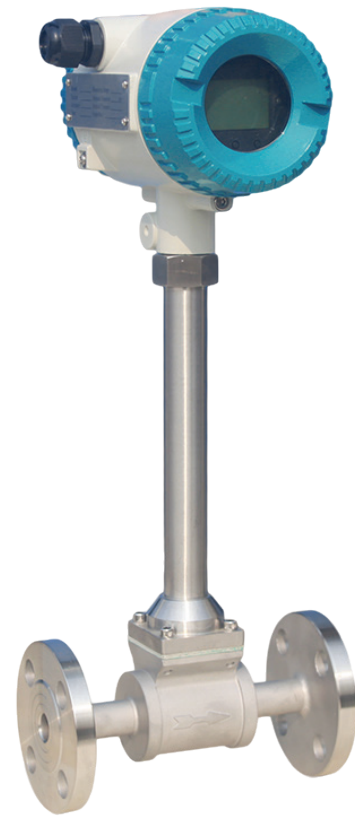


## FLOW RANGE FOR SUPERHEATED STEAM

Dimension (mm)	Low flow limit (kg/h)	High flow limit (kg/h)	Dimension (mm)	Low flow limit (kg/h)	High flow limit (kg/h)
25	13,1 √ P	131 √ P	100	164,7 √ P	1647 √ P
32	23,0 √ P	184 √ P	125	247,1 √ P	2471 √ P
40	26,5 √ P	265 √ P	150	329,4 √ P	3294 √ P
50	49,4 √ P	494 √ P	200	658,8 √ P	6588 √ P
65	82,3 √ P	823 √ P	250	988,2 √ P	9882 √ P
80	115,3 √ P	1153 √ P	300	1647 √ P	16470 √ P

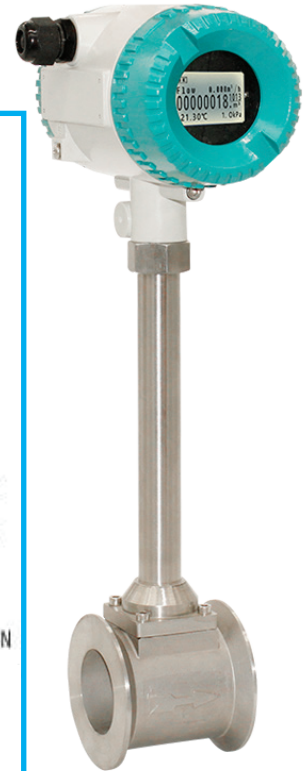
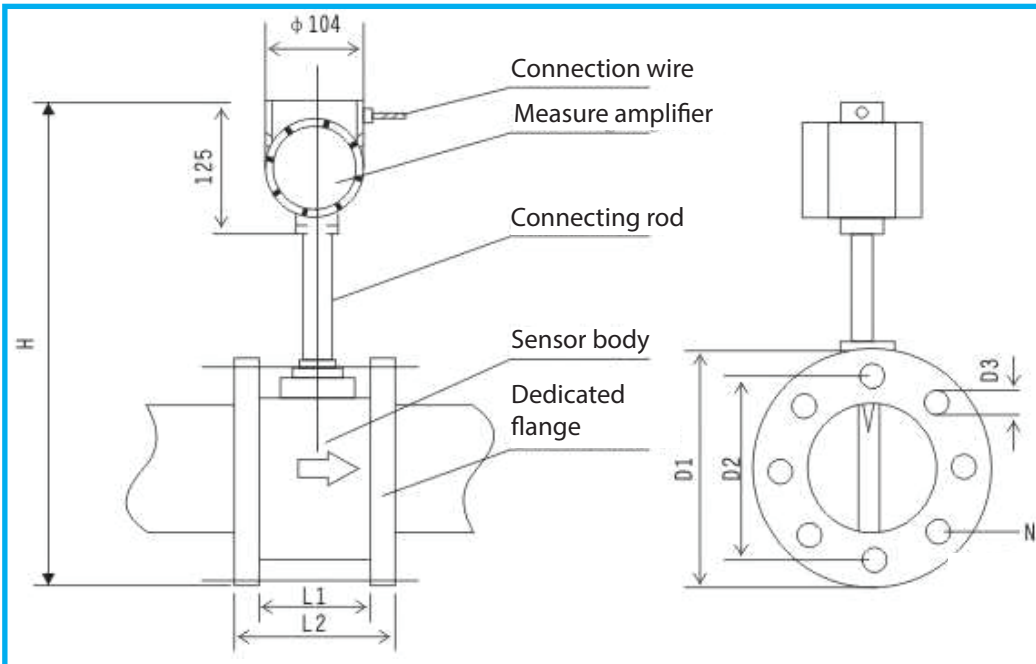
## INSTALLING THE FLOWMETER

### VORTEX FLOWMETER - FLANGE CONNECTION



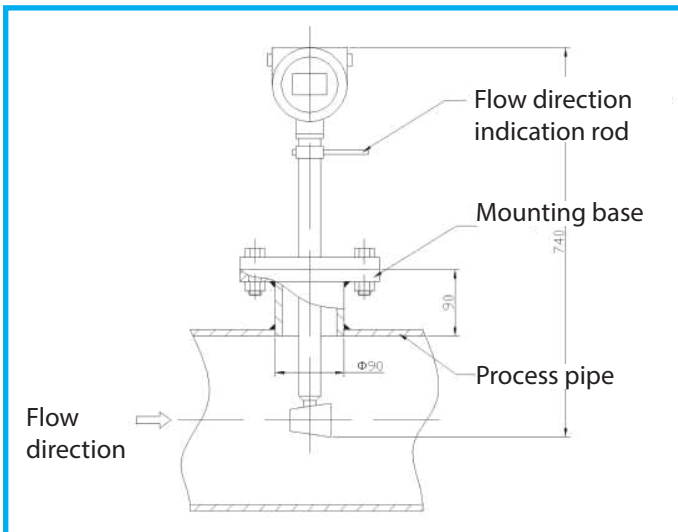
Caliber	Inner Ø D1 (mm)	Length L (mm)	Flange outer Ø D3 (mm)	Center distance of bolt hole (mm)	Flange thickness C (mm)	Bolt hole Ø d (mm)	Number of screws
25	25	170	150	110	18	18	4
32	32	170	155	115	18	18	4
40	40	190	160	120	18	18	4
50	50	190	165	125	20	18	4
65	65	220	185	145	20	18	4
80	80	220	200	160	20	18	8
100	100	240	220	180	22	18	8
125	125	260	250	210	22	18	8
150	150	280	285	240	24	22	8
200	200	300	240	295	26	22	12
250	250	360	405	355	28	26	12
300	300	400	460	410	32	26	12

## VORTEX FLOWMETER - WAFER CONNECTION



Caliber	L1	L2	D1	D2	H	D3	N	Caliber	L1	L2	D1	D2	H	D3	N
20	65	95	125	100	460	13	4	100	90	132	230	190	544	17	8
25	65	95	125	100	460	13	4	125	100	146	245	210	564	17	8
40	75	109	145	110	470	13	4	150	120	170	280	240	594	21	8
50	75	109	160	125	481	17	4	200	150	200	335	295	646	21	12
65	75	117	180	145	497	17	6	250	160	214	405	355	708	21	12
80	90	122	195	160	510	17	6	300	170	224	460	410	760	21	12

## VORTEX FLOWMETER - INSERTION CONNECTION



**Insertion Vortex flowmeters** are mainly used in big pipelines for measuring gas, liquid and steam.

The characteristics are simple structure, no moving parts, low pressure loss, wide measuring ratio and excellent cost-performance ratio.

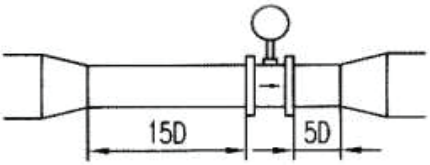
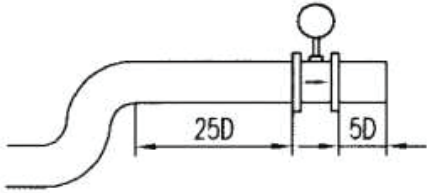
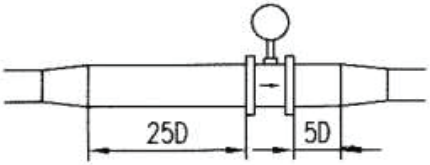
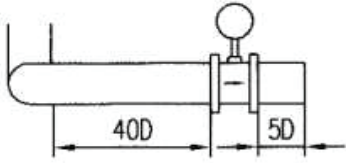
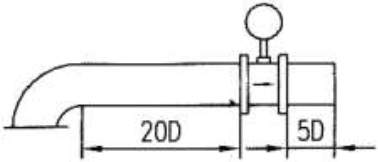
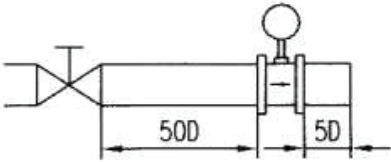
For the installation consider:

- Mounting base = insertion of the pipe and the sensing elements inside the process line
- Base of the pipe not sloped
- No weld burrs
- Flange plane parallel to the pipe axis
- Ensure correspondence between flow direction and its indication on the meter (do not push the rod pointing at the flow direction).



## MOUNTING CONDITIONS

The flow sensor should be installed horizontally or vertically (with flow direction from bottom to top) on the pipe, which must correspond to the nominal diameter of the sensor. Straight upstream and downstream runs are required.

Same restriction and fully open valve		2 x 90° elbow on the same plane	
Same pipe expansion		2 x 90° elbow on different planes	
1 x 90°-elbow		Adjustable valve and half-open valve	



- Near the installation point, the pipeline must be filled with the medium to be measured
- Avoid installing the sensor in pipes subject to strong vibrations
- The internal diameter of the straight run should match as much as possible that of the sensor; if not, use a pipe slightly larger than the sensor diameter
- If the measures have to be compensated in temperature and pressure, a pressure measuring point 3-5 DN away from the sensor and a temperature measuring point 5-6 DN away should be provided
- If the measured medium may contain impurities, it is recommended to install filters beyond the length required for the straight run of the sensor
- Avoid installing the sensor where there is strong electromagnetic interference, in spaces that are difficult to access for maintenance tasks



## SELECTION GUIDE

The order code consists of the root of the product (S-TVX-) followed by the positions based on the selected options.



<b>S-VTX-LUGB2</b>	
<b>MODEL</b>	
Insertion type	I
Flange type	F
Wafer type	W
<b>VERSION</b>	
V	C
VTP	R
<b>INSERTION LENGTH (insertion type)</b>	
200 mm	2
300 mm	3
400 mm	4
500 mm	5
Other on request	6
<b>STEAM in SS 316 optional</b>	
	SS
<b>PROCESS CONNECTION (insertion type)</b>	
Flange DN 80 + ball valve in CS	F
<b>FLANGE (flange type SS 304)</b>	
DN 15 mm - 1/2"	15
DN 20 mm - 3/4"	20
DN 25 mm - 1"	25
DN32 mm - 1 1/4"	30
DN 40 mm -1 1/2"	40
DN 50 mm 2"	50
DN 65 mm - 2 1/2"	65
DN 80 mm - 3"	80
DN 100 mm - 4"	100
DN 125 mm - 5"	125
DN 150 mm - 6"	150
DN 200 mm - 8"	200
DN 250 mm 10"	250
DN 300 mm 12"	300
<b>BODY in SS316 optional</b>	
	SS

<b>WAFER (wafer type SS 304 )</b>	
DN 15 mm - 1/2"	15
DN 20 mm - 3/4"	20
DN 25 mm - 1"	25
DN32 mm - 1 1/4"	30
DN 40 mm -1 1/2"	40
DN 50 mm 2"	50
DN 65 mm - 2 1/2"	65
DN 80 mm - 3"	80
DN 100 mm - 4"	100
DN 125 mm - 5"	125
DN 150 mm - 6"	150
DN 200 mm - 8"	200
DN 250 mm 10"	250
DN 300 mm 12"	300
<b>BODY in SS316 optional</b>	
	SS
<b>PRESSURE RATING</b>	
2.5 Mpa ( DN15 - DN80 )	25
1.6 Mpa ( DN100 - DN150 )	15
1.0 Mpa ( DN200 - DN300 )	10
<b>TEMPERATURE RATING</b>	
Max 250°C	T1
Max 350°C	T2
<b>POWER SUPPLY</b>	
AC 85...250 V	AC
DC 20...36 V	DC
<b>OUTPUT SIGNAL</b>	
4..20 mA + Pulse + RS485	RS
4..20 mA + Pulse + HART	HT
<b>CERTIFICATE</b>	
CE	CE
ATEX Ex ia	ATEX



We are a company with more than 50 years of experience in the field of industrial measurement and control instrumentation.

**Specifically, we look at the internalization of some measuring systems that, due to shipping speed, performance, and low costs, can be offered in multiple industrial branches, from food to petrochemicals, from pharmaceuticals to energy production, from naval to water treatment.**

Each process has specific requirements, which depend on the characteristics of the system, the environment, and the fluid to be treated.

SMERI International offers tailor-made instrumentation for liquids and gases, from the most common to the most critical ones.

We have the luck and the merit to benefit from a young and highly dynamic team of experts, who can recommend ad-hoc solutions for each application to optimize customers' processes in terms of economic efficiency and safety.

The motto is *Finding solutions together* and summarizes the spirit of SMERI: **a close collaboration with the customer and according to an ethical behavior of respect, fairness, and confidentiality.**

In the European market, SMERI is represented and distributed by companies well-known in the industrial world for their seriousness and experience.

**SMERI s.r.l.**

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