→ Series VS1

→ Series VS3

→ Limit switches



VARIABLE AREA FLOW METERS

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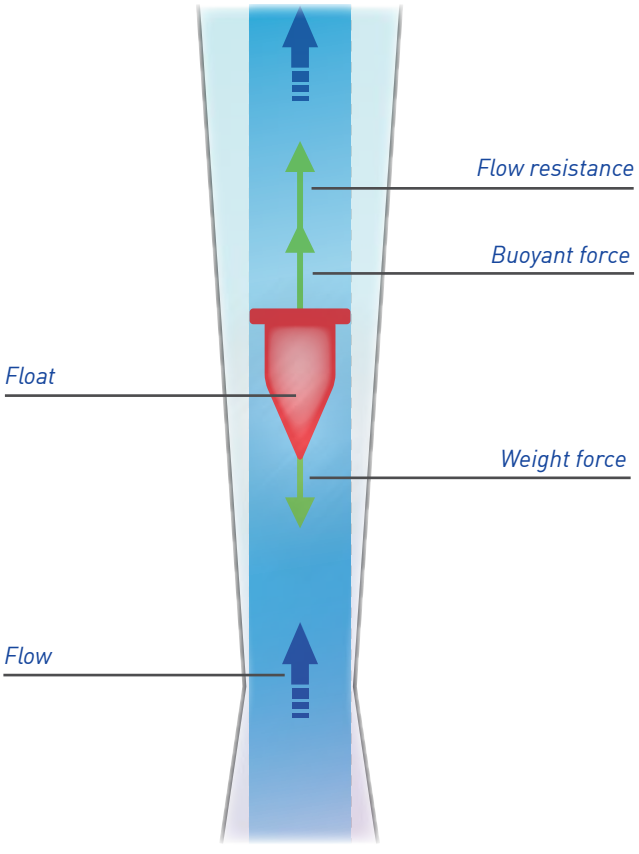
Variable area flow meters

Principle of operation

Variable area flow meters are used in pipelines and determine the volume flow of liquids or gases there. The flow meter consists of a conical measuring tube with a float inside it.

The measuring principle is based on the body being vertically deflected through the flowing medium. Various forces act on the float - the flow resistance, the buoyant force, as well as the weight force of the body.
In summary, if the volume flow rises, the float is lifted. The current flow is indicated on the scale at the top of the float.

These flow meters feature a water scale in l/h and a % scale as standard. Optional air scales are also available for various operating pressures. Two adjustable reference value indicators facilitate monitoring of the rate of flow. Limit contacts are available as accessories.





Advantages

- Unbreakable and corrosion resistant
- Radially extendable
- Special self-adhesive scales for liquid and gaseous media
- Check rail for accessories (limit switches)
- Size (DN), measuring range and material marked on tube
- Floats and stops generally made of PVDF
- Measuring ranges 1.5...60 000 l/h
- Various number of nominal sizes available



Variable area flow meters

Series VS1

Type VS1



Technical data			
Type	**VS11...**	**VS12...**	**VS13...**
Accuracy	Class 4 according to VDI / VDE 3513 Page 2		
Pressure rating	PN 10		
Medium temperature	0...60 °C		
Material			
Tube	PA	PSU	PVC
Float	PVDF		
Stops/internals	PVDF		
O-Ring	EPDM		
Slip fit process connections	PVC		
Guiding bar (VS1 50 l... and larger)	PVDF/stainless steel		

Measuring accuracy										
Flow rate in %	10	20	30	40	50	60	70	80	90	100
Total error of measured value in %	13.00	8.00	6.33	5.50	5.00	4.67	4.43	4.25	4.11	4.00
Total error of range in %	1.3	1.6	1.9	2.2	2.5	2.9	3.1	3.4	3.7	4.0

Options		
For type	**On request**	**Required Information**
VS1	→ Special scale	→ Medium → Specific weight → Viskosity → Medium temperature

Measuring range water flow

Type	Nominal size	Measuring range [l/h, water)	Typical pressure drop [mbar]*
VS1_25 A... **VS1_25 B...**	DN 25	50...500 100....1000	22.84
VS1_32 C... **VS1_32 E...**	DN 32	150...1500 250...2500	22.84
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	200...2000 300...3000 600...6000	24.99
VS1_50 G... **VS1_50 H...**	DN 50	600...6000 1000...10000	24.99
VS1_50 I...		1500...15000	28.23
VS1_65 J... **VS1_65 K...**	DN 65	2000...20000 3000...30000	45.67
VS1_65 L...		8000...60000	47.24

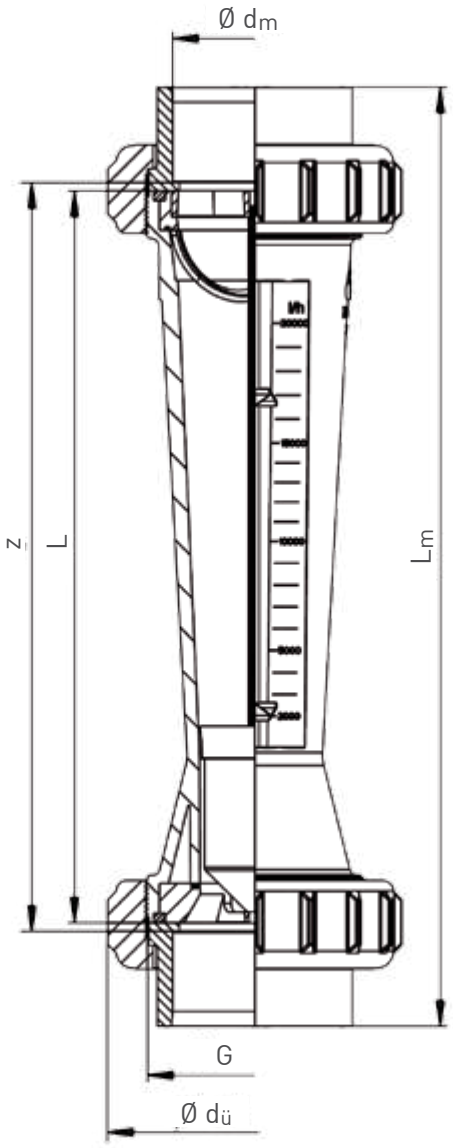
* Within entire measuring range

Measuring range air flow

Working pressure		0 bar	1 bar	2 bar	3 bar	4 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**				
VS1_25 A... **VS1_25 B...**	DN 25	1.5...14 2.5...29	3...20 4...41	3...24 5...50	3...28 5...58	4...31 6...65
VS1_32 C... **VS1_32 E...**	DN 32	4...45 7...79	6...63 10...111	7...77 12...136	8...90 14...158	9...100 16...177
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	6...58 9...108 17...174	9...82 13...152 24...246	11...100 16...186 30...301	12...116 18...216 34...348	14...130 21...241 39...389
VS1_50 G... **VS1_50 H...** **VS1_50 I...**	DN 50	17...175 29...301 53...405	24...247 41...425 75...572	30...302 51...520 92...700	34...350 58...602 106...810	39...392 65...674 119...907
VS1_65 J... **VS1_65 K...**	DN 65	55...545 80...758	78...770 113...1072	96...942 139...1311	110...1090 160...1516	124...1220 180...1697

Measuring range air flow

Working pressure		5 bar	6 bar	7 bar	8 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**			
VS1_25 A... **VS1_25 B...**	DN 25	4...34 7...71	5...37 7...76	5...39 8...82	4.5...42 7.5...87
VS1_32 C... **VS1_32 E...**	DN 32	10...110 18...193	11...119 19...209	12...127 20...223	12...135 21...237
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	15...142 23...264 42...426	16...153 24...286 45...461	17...164 26...305 49...492	18...174 27...324 51...522
VS1_50 G... **VS1_50 H...** **VS1_50 I...**	DN 50	42...428 72...737 130...992	45...463 77...797 141...1073	49...495 83...851 150...1146	51...525 87...903 159...1215
VS1_65 J... **VS1_65 K...**	DN 65	135...1335 197...1857	146...1444 212...2008	156...1542 227...2145	165...1635 240...2274



Dimensions [mm]

DN	G	d_m	L	z	L_m	$d_ü$
25	1½"	32	335	341	385	60
32	2"	40	335	341	393	72
40	2¼"	50	335	341	403	83
50	2¾"	63	335	341	417	103
65	3½"	75	335	341	429	122

Order code		Example → VS11	25 A	11	W0
Tube material					
PA		VS11			
PSU		VS12			
PVC		VS13			
Nominal size	**Measuring range water**				
DN 25					
	50...500 l/h		25 A		
	100...1000 l/h		25 B		
DN 32					
	150...1500 l/h		32 C		
	250...2500 l/h		32 E		
DN 40					
	200...2000 l/h		40 D		
	300...3000 l/h		40 F		
	600...6000 l/h		40 G		
DN 50					
	600...6000 l/h		50 G		
	1000...10 000 l/h		50 H		
	1500...15 000 l/h		50 I		
DN 65					
	2000...20 000 l/h		65 J		
	3000...30 000 l/h		65 K		
	8000...60 000 l/h		65 L		
Float					
Standard				11	
With magnet (for use with limit switches)				21	
Scale					
Water flow l/h and %					W0
Air flow 0 bar					00
Air flow 1 bar					10
Air flow 2 bar					20
Air flow 3 bar					30
Air flow 4 bar					40
Air flow 5 bar					50
Air flow 6 bar					60
Air flow 7 bar					70
Air flow 8 bar					80

Variable area flow meters

Series VS3

Type VS3



Technische Daten		
Type	**VS32...**	**VS33...**
Accuracy	Class 4 according to VDI / VDE 3513 Page 2	
Pressure rating	PN 10	
Medium temperature	0...60 °C	
Material		
Tube	PSU	PVC
Float	PVDF	
Stops/internals	PVDF	
O-Ring	EPDM	
Slip fit process connections	PVC	

Measuring accuracy										
Flow rate in %	10	20	30	40	50	60	70	80	90	100
Total error of measured value in %	13.00	8.00	6.33	5.50	5.00	4.67	4.43	4.25	4.11	4.00
Total error of range in %	1.3	1.6	1.9	2.2	2.5	2.9	3.1	3.4	3.7	4.0

Options		
For type	**On request**	**Required Information**
VS3	→ Special scale	→ Medium → Specific weight → Viskosity → Medium temperature

Measuring range water flow

Type	Nominal size	Measuring range [l/h, water]	Typical pressure drop [mbar]*
VS3_10 P...	DN 10	1.5...15	4.51
VS3_10 Q...		2.5...25	
VS3_10 R...		5...50	
VS3_10 T...		10...100	
VS3_15 S...	DN 15	8...80	4.38
VS3_15 U...		15...150	
VS3_15 V...		20...200	
VS3_25 U...	DN 25	15...150	8.12
VS3_25 W...		30...300	
VS3_25 A...		50...500	
VS3_25 B...		100...1000	

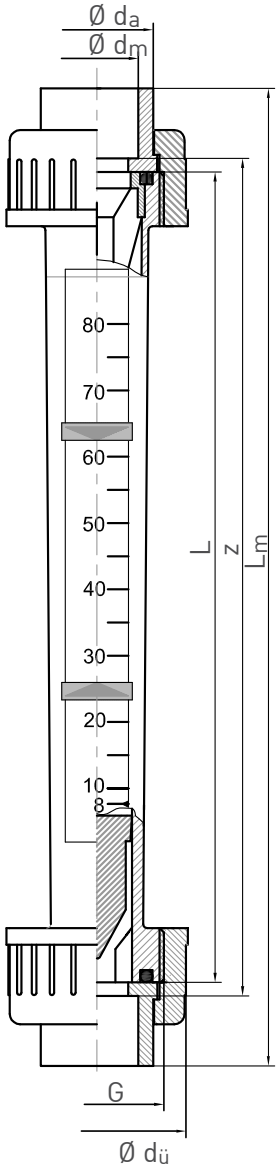
* Within entire measuring range

Measuring range air flow

Working pressure		0 bar	1 bar	2 bar	3 bar	4 bar	5 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**					
VS3_10 P...	DN 10	0.1...0.55	0.15...0.80	0.17...0.9	0.20...1.1	0.25...1.20	0.25...1.3
VS3_10 Q...		0.2...0.95	0.25...1.3	0.3...1.6	0.4...1.9	0.4...2.1	0.5...2.4
VS3_10 R...		0.5...1.9	0.7...2.7	0.8...3.4	1.0...3.8	1.2...4.2	1.2...4.6
VS3_10 T...		0.8...3.0	1.0...4.2	1.2...5.4	1.4...6.4	1.6...7.0	1.6...7.4
VS3_15 S...	DN 15	0.6...2.8	0.8...4	1.0...5.0	1.2...5.6	1.4...6.4	1.4...7.0
VS3_15 U...		1.4...5.6	2...8	2...10	3...12	3...13	3...14
VS3_15 V...		1.5...7.0	2...10	3...13	3...15	4...17	4...18
VS3_25 U...	DN 25	1.0...6,5	1...9	1.5...11	2...13	2...14.5	2...16
VS3_25 W...		1.5...11	2...15	2.5...18	3...22	3...24	4...26
VS3_25 A...		3...18	4...25	5...30	5...35	6...40	6...44
VS3_25 B...		6...30	8...44	10...54	12...62	12...70	15...75

Measuring range air flow

Working pressure		6 bar	7 bar	8 bar	9 bar	10 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**				
VS3_10 P...	DN 10	0.26...1.45	0.30...1.5	0.3...1.6	0.3...1.7	0.35...1.8
VS3_10 Q...		0.5...2.5	0.5...2.7	0.6...2.9	0.6...3.0	0.6...3.2
VS3_10 R...		1.2...5.0	1.4...5.4	1.4...5.8	1.6...6.0	1.6...6.4
VS3_10 T...		2.0...8.0	2.0...8.8	2.0...9.0	2.0...10	2...10
VS3_15 S...	DN 15	1.5...7.5	1.5...8.0	1.5...8.5	2.0...9.0	2.0...9.5
VS3_15 U...		3.5...15	3.5...16.5	4...17	4...18	4...19
VS3_15 V...		4...20	5...21	5...23	5...23	5...25
VS3_25 U...	DN 25	2...17	2.5...18	2.5...19.5	3...20	3...21
VS3_25 W...		4...28	4...30	4...33	5...34	5...35
VS3_25 A...		8...48	8...50	8...54	8...56	10...60
VS3_25 B...		15...80	15...85	20...90	20...95	20...100



Dimensions [mm]						
DN	**G**	**dm**	**L**	**z**	**Lm**	**dü**
10	¾ "	16	165	171	199	35
15	1 "	20	185	191	223	43
25	1 ½ "	32	200	206	250	60

Order code		Example → VS32	10 P	11	W0
Tube material					
PSU		VS32			
PVC		VS33			
Nominal size	**Measuring range water**				
DN 10					
	1.5...15		10 P		
	2.5...25		10 Q		
	5...50		10 R		
	10...100		10 T		
DN 15					
	8...80		15 S		
	15...150		15 U		
	20...200		15 V		
DN 25					
	15...150		25 U		
	30...300		25 W		
	50...500		25 A		
	100...1000		25 B		
Float					
Standard				11	
With magnet (for use with limit switches)				21	
Scale					
Water flow l/h and %					W0
Air flow 0 bar					00
Air flow 1 bar					10
Air flow 2 bar					20
Air flow 3 bar					30
Air flow 4 bar					40
Air flow 5 bar					50
Air flow 6 bar					60
Air flow 7 bar					70
Air flow 8 bar					80
Air flow 9 bar					90
Air flow 10 bar					Z0

Accessories

Limit switches

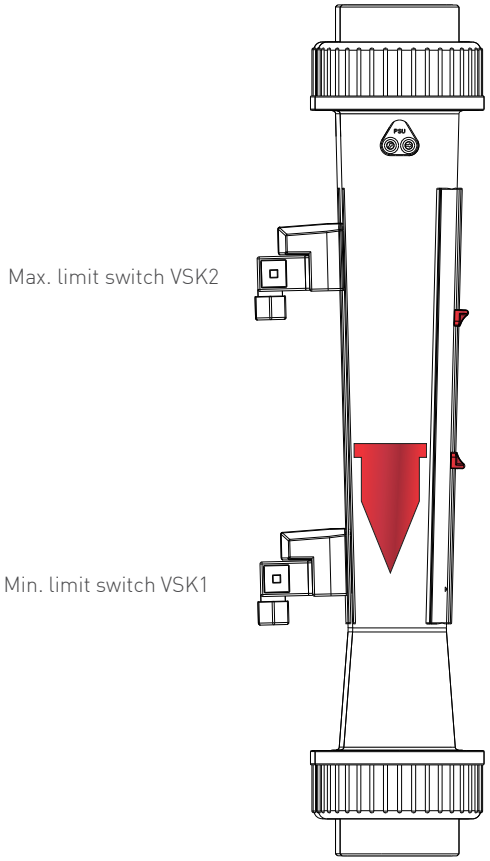
Application

The limit switches VSK1 and VSK2 serve for external monitoring of limited flow rates on our variable area flow meters. They are fitted on the check rail on the flow meter and can be adjusted to any switching point on the respective scale.

Function

The magnet in the float closes or opens a reed contact encapsulated in the limit switch. The switching function is bistable. This means that switching state is also maintained when the magnetic float is at a distance from the contact. Important to note when retrofitting limit switches is that the standard float must be replaced with a magnetic float.





Technical datas	
Switching voltage	Max. 230 V AC / DC
Switching capacity	Max. 10 W / 12 VA
Switching current	Max. 0.5 A
Contact resistance	200 mΩ
Insulation resistance	10^{11} Ω
Ambient temperature	0...55 °C
Degree of protection DIN 40050	IP65 according to
Switching hysteresis	1 - 2 mm float travel

Switching states and order code

Limit switches	Float		Tag	Order code
	below	above		
Min. limit switch			min	VSK1
Max. limit switch			max	VSK2



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