

SITRANS F flowmeters

SITRANS F VA

Trogflux variable area meter

Overview



SITRANS F VA Trogflux variable area meter

Application

The SITRANS F VA Trogflux variable area meters are used to measure the volume of transparent liquids and gases passing through closed piping. The variable area meters can also be used for flow monitoring if they are equipped with one or more switching contacts. Standard scales are available for liquids with a density of 1 kg/l (62.43 lb/cu.ft). The scales must be recalculated for all other media depending on the physical characteristics.

The product is manufactured by MECON GmbH and distributed by Siemens.

Design and operation

The main components of the SITRANS F VA Trogflux variable area meters are the plastic variable-area flow tube with float and the connection parts. The flow is displayed directly on the scale present on the flow tube (e.g. in l/h) and is read at the position of the float's widest diameter.

Special features

- Product scales for liquids and gases
- Simple assembly and handling
- Low-price plastic design
- Short delivery times for standard versions.

Connection and mode of operation

For certain variable area meter sizes, the float is packed in a plastic net for transport purposes. Prior to fitting, this must be removed out of the variable area meter from the top. Free movement of the float in the flow tube should then be rechecked. The variable area meter must be fitted vertically and without tension. Control elements or reductions/extensions in the pipe diameter upstream or downstream of the variable area meter have no influence on the accuracy when measuring liquids. However, when measuring gases, the variable area meter should be installed upstream of valves to prevent pulsations resulting from compression. Since variable area meter respond extremely sensitively to changes in flow, control elements should always be adjusted slowly.

The calibration has been carried out for defined media conditions. Deviations in the density, pressure or temperature of gases, or in the density or viscosity of liquids, result in measurement errors. It is essential to observe the calibration conditions. When ordering, it is therefore essential to provide data on the medium, density and viscosity at the operating temperature and pressure.

With gases, it is additionally necessary to specify the exact reference point for the pressure (pressure above atmospheric, or absolute pressure).

Retrofitting of switching contacts is only possible if variable area meters with magnets are used. When using for the first time, move the float completely past the contact to permit polarization.

Technical specifications

Application	See left
Mode of operation	See left
Measuring principle	Float

Input

Flow	Vertically upwards
Pressure limit	Max. 10 bar (145 psi) (see page 4/223)

Rated operating conditions

Ambient conditions

- Temperature limits
- For Trogamid flow tube Max. 60 °C (140 °F)
(50 °C (122 °F) with water)
 - For polysulfone flow tube Max. 90 °C (194 °F)

Medium conditions

- Accuracy Class 2.5 (according to VDE/DI 3513, sheet 2)
See tables page 4/223
 - Measuring range
 - For liquids 12.5 l/h to 25 m³/h
(0.055 to 110 USgpm)
 - For gases 200 l/h to 430 m³/h
(0.118 to 253 scfm)
 - Dimensions for measured variable l/h (up to flow tube D2500)
m³/h (flow tube E4000 and above)
- A special scale must be provided for liquids with a density other than 1 kg/l (62.43 lb/cu.ft) and all gases

Design

Connections	PVC adhesive bushing, female thread, cast iron
Material	Trogamid, polysulfone
• Flow tube	
• Connection	PVC, cast iron
- Union nut	PVC, cast iron, steel, stainless steel
- Insert	Stainless steel, mat. No. 1.4305/303, mat. No. 1.4571/316Ti, PVC, aluminium
• Float	Stainless steel, mat. No. 1.4571/316Ti (option with flow tubes C125 to D2500)
• Float guide rod	Buna N (with Trogamid flow tube) Viton (with polysulfone flow tube) EPDM (for potable water plants)
• Gasket	Polysulfone
• Limit	

Certificates and approvals

Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 2 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
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Technical specifications of contacts

Designation	K18 A, K18 B
Housing/plug	PP/PA 6
Contact material	Rhodium
Degree of protection	IP 65
Ambient temperature	-20 to +80 °C (-4 to +176 °F)
Max. switching frequency	5/min
Max. rating (rating data apply to resistive loads; a suppressor circuit is required for inductive loads)	AC 250 V/0.5 A/10 VA DC 250 V/0.5 A/5 W

Measuring ranges for liquids

PVC adhesive bushing [mm]	Female thread	Flow tube	Dynamics	Max. measuring range for the selected floats									
				Stainless steel, mat. No.		Stainless steel with magnet, mat. No.		PVC weighted		PVC with magnet, weighted		Viscosity-compensated stainless steel, mat. No.	
				1.4305	303	1.4571	316Ti	l/h	(USgpm)	l/h	(USgpm)	l/h	(USgpm)
20	(G ¹ / ₄), (G ³ / ₈), G ¹ / ₂	C 125	1:10	125	(0.55)	120	(0.53)	65	(0.29)	65	(0.29)	100 *	(0.44)*
		C 315	1:10	315	(1.39)	300	(1.32)	175	(0.77)	175	(0.77)	240 *	(1.06)*
32	(G ¹ / ₂), (G ³ / ₄), G1	D 650 ¹⁾	1:10	TS 650	(TS 2.86)	TS 600	(TS 2.64)	TS 500	(TS 2.20)	TS 450	(TS 1.98)	TS 400 *	(TS 1.76)*
		D 650 ²⁾	1:10	PS 600	(PS 2.64)	PS 550	(PS 2.42)	PS 450	(PS 1.98)	PS 400	(PS 1.76)	PS 350 *	(PS 1.54)*
		D 1000	1:10	1000	(4.4)	950	(4.18)	750	(3.30)	700	(3.08)	600 *	(2.64)*
		D 1600	1:10	1600	(7.04)	1500	(6.6)	1250	(5.50)	1100	(4.84)	1000 *	(4.4) *
		D 2500	1:10	2500	(11.0)	2400	(10.6)	2000	(8.81)	1750	(7.7)	1400 *	(6.16)*
63	(G ¹ / ₄), (G ¹ / ₂), G2	E 4000	1:10	4000 *	(17.6) *	3800 *	(16.7)*	3200	(14.1)	3200	(14.1)	2500 *	(11.0) *
		E 6500	1:10	6500 *	(28.6) *	6400 *	(28.2)*	5000	(22.0)	5000	(22.0)	4000 *	(17.6) *
		F 10000	1:10	10000 *	(44.0) *	9500 *	(41.8)*	7500	(33.0)	7500	(33.0)	5500 *	(24.2) *
		G 16000	1:4	16000 ³⁾ *	(70.4) ³⁾ *	16000 *	(70.4)*	12500	(55.0)	12500	(55.0)	-	-
		H 20000	1:3	20000 ³⁾ *	(88.0) ³⁾ *	19000 *	(83.6)*	-	-	-	-	-	-
		J 25000	1:3	25000 ³⁾ *	(110.0) ³⁾ *	24000 *	(106.0)*	-	-	-	-	-	-

Standard measuring range for liquid ($\rho = 1 \text{ kg/l}$ (62.43 lb/cu.ft), viscosity 1 mPa·s (1 cp)) (connections in brackets are non-standard)

Measuring ranges for air

PVC adhesive bushing [mm]	Female thread	Flow tube	Dynamics	Max. measuring range for the selected floats							
				Aluminium, mat. No. 3.1645		Aluminium with magnet, mat. No. 3.1645		PVC non-weighted		PVC with magnet	
				l/h	(scfm)	l/h	(scfm)	l/h	(scfm)	l/h	(scfm)
20	(G ¹ / ₄), (G ³ / ₈), G ¹ / ₂	C 125	1:10	2000	(1.18)	2500	(1.47)	1400	(0.82)	2200	(1.29)
		C 315	1:10	5000	(2.94)	6400	(3.77)	3400	(2.00)	6000	(3.53)
32	(G ¹ / ₂), (G ³ / ₄), G1	D 650 ¹⁾	1:10	TS 10000	(5.98)	TS 12000	(7.06)	TS 7000	(4.12)	TS 10000	(5.89)
		D 650 ²⁾	1:10	PS 9000	(5.30)	PS 10500	(6.18)	PS 6500	(3.83)	PS 9000	(5.30)
		D 1000	1:10	16000	(9.42)	20000	(11.77)	11000	(6.47)	16000	(9.42)
		D 1600	1:10	28000	(16.48)	32000	(18.83)	18000	(10.59)	25000	(14.71)
		D 2500	1:10	40000	(23.54)	50000	(29.43)	28000	(16.48)	40000	(23.54)
63	(G ¹ / ₄), (G ¹ / ₂), G2	E 4000	1:10	64000 *	(37.67)*	75000 *	(44.14)*	45000	(26.49)	60000	(35.31)
		E 6500	1:10	100000 *	(58.86)*	125000 *	(73.57)*	75000	(44.14)	100000	(58.86)
		F 10000	1:10	160000 *	(94.17)*	180000 *	(105.9)*	120000	(70.63)	160000	(94.17)
		G 16000	1:4	280000 *	(164.8)*	300000 *	(176.6)*	190000 *	(111.8)*	-	-
		H 20000	1:3	350000 *	(206.0)*	400000 *	(235.4)*	240000 *	(141.3)*	-	-
		J 25000	1:3	430000 *	(253.1)*	480000 *	(282.5)*	300000 *	(176.6)*	-	-

Standard measuring range for air ($p_{\text{abs}} = 1.013 \text{ bar}$ (14.69 psi), at $T = 20 \text{ °C}$ (68 °F)) (connections in brackets are non-standard)

Pressure losses

Flow tube	Pressure loss			
	Liquid		Air	
	Float		Aluminium float	
	Mat. No. 1.4305	Mat. No. 303	Mat. No. 3.1645	
	mbar	(psi)	mbar	(psi)
C 125	11	(0.160)	4	(0.058)
C 315	13	(0.189)	5	(0.073)
D 650	17	(0.247)	7	(0.102)
D 1000	17	(0.247)	7	(0.102)
D 1600	20	(0.291)	7	(0.102)
D 2500	24	(0.349)	8	(0.116)
E 4000	25	(0.364)	9	(0.131)
E 6500	27	(0.393)	10	(0.145)
F 10000	32	(0.465)	13	(0.189)
G 16000	51	(0.740)	23	(0.334)
H 20000	65	(0.943)	31	(0.451)
J 25000	91	(1.320)	43	(0.625)

- * Guided float.
- ¹⁾ With Trogamid flow tube.
- ²⁾ With polysulfone flow tube.
- ³⁾ Float, flow tube G, H and J: mat. No. 1.4571/316Ti.

Pressure losses of variable area meters

SITRANS F flowmeters

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Trogflux variable area meter

Contact assembly

The bistable contact assembly K18 consists of a contact spring set sealed in a glass tube filled with protective gas. The contact springs are polarized by a fixed magnet such that they exhibit a bistable response.

Two contacts can be selected:

- K 18 A: contact closes when the limit is fallen below
- K 18 B: contact closes when the limit is exceeded.

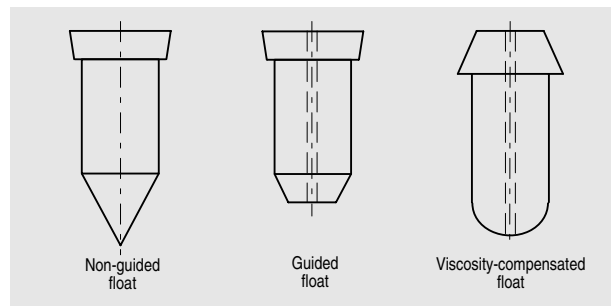
Selection of float

There are three versions of floats:

- Non-guided float
- Guided float
- Viscosity-compensated float.

Use of the viscosity-compensated float is necessary above the following viscosities:

Flow tube	mPa·s (cp)
C 125 to C 315	≥ 3
D 650 to D 2500	≥ 5
E 4000 to F 10000	≥ 8



Float versions

Pressure and temperature limits

Trogamid T		Polysulfone
t [°C (°F)]	p _e [bar (psi)]	p _e [bar (psi)]
-10 to +60 (14 to 140)*	10 (145)	10.0 (145)
80 (176)	-	10.0 (145)
90 (194)	-	8.5 (123)

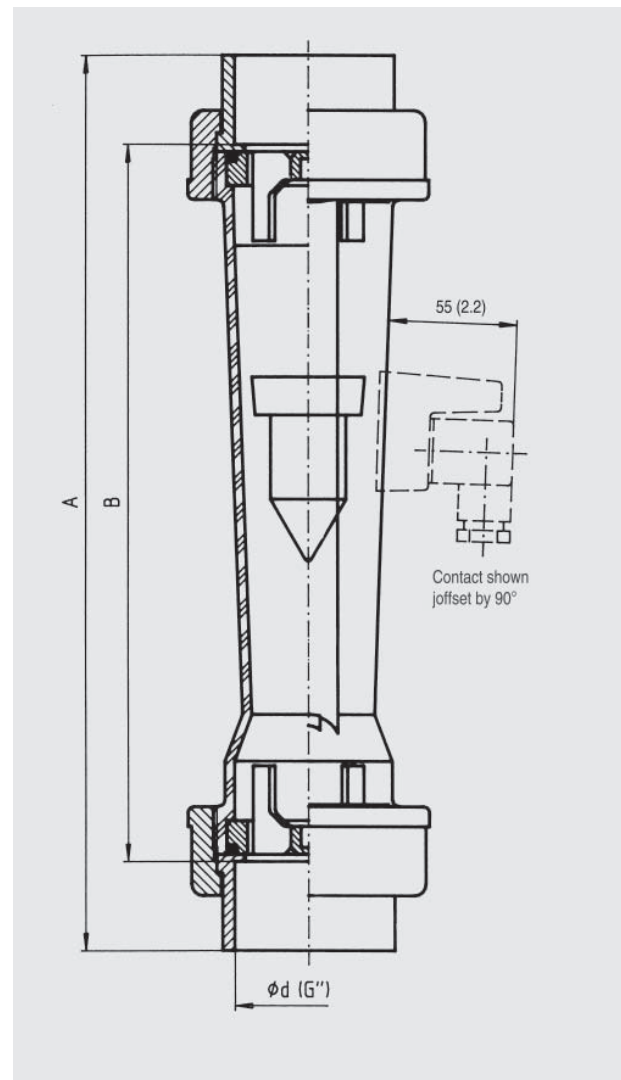
* Only up to 50 °C (122 °F) with water

Connection parts PVC DIN 8062		
Media	t [°C (°F)]	p _e [bar (psi)]
With water and non-corrosive liquids	20 (68)	10.0 (145)
	40 (104)	10.0 (145)
	60 (140)	2.5 (36)
With corrosive liquids	20 (68)	10.0 (145)
	40 (104)	4.0 (58)
	60 (140)	1.0 (15)

p_e = effective pressure = pressure above atmospheric

Dimensions

PVC adhesive bushing mm (inches)	Connection	Dimensions of inserts			Weight
		With female thread	With PVC adhesive bushing		
d	G*	A ±4 mm (A ±0.16 inch)	A ±4 mm (A ±0.16 inch)	B ±4 mm (B ±0.16 inch)	Approx. kg (lb)
20 (0.79)	G½	344 (13.54)	340 (13.39)		0.4 (0.88)
32 (1.26)	G1	353 (13.90)	352 (13.86)	306 (12.05)	0.7 (1.54)
63 (2.49)	G2	372 (14.65)	382 (15.04)		2.2 (4.85)





SITRANS F VA Trogflux, dimensions in mm (inches)

SITRANS F flowmeters

SITRANS F VA

Trogflux variable area meter

Ordering data	Order No.
SITRANS F VA variable area meter	
Type Trogflux	
Plastic flow tube	
Trogamid	7ME5801-
Polysulfone	7ME5806-
	
Gasket material	
Buna N (standard)	1
Viton	4
EPDM	8
Flow tube size	
C 125	A
C 315	B
D 650	C
D 1000	D
D 1600	E
D 2500	F
E 4000	G
E 6500	H
F 10000	J
G 16000	K
H 20000	L
J 25000	M
Float/material	
Flow tube size C/mat. No. 1.4305/303	C 1
Flow tube size C/mat. No. 1.4571/316 Ti	C 2
Flow tube size C/PVC, weighted	C 3
Flow tube size C/mat. No. 1.4571/SV/316Ti	C 4
Flow tube size C/aluminium 3.1645	C 5
Flow tube size C/PVC, not weighted	C 6
Flow tube size D/mat. No. 1.4305/303	D 1
Flow tube size D/mat. No. 1.4571/316 Ti	D 2
Flow tube size D/PVC, weighted	D 3
Flow tube size D/mat. No. 1.4571/SV/316Ti	D 4
Flow tube size D/aluminium 3.1645	D 5
Flow tube size D/PVC, not weighted	D 6
Flow tube size E-F/mat. No. 1.4305/303	E 1
Flow tube size E-J/mat. No. 1.4571/316Ti	E 2
Flow tube size E-G/PVC, weighted	E 3
Flow tube size E-F/mat. No. 1.4571/SV/316Ti	E 4
Flow tube size E-J/aluminium 3.1645	E 5
Flow tube size E-F/PVC, not weighted	E 6
Flow tube size G-J/PVC, weighted	E 7
Connection material	
PVC (standard, only for plastic tubes)	1
Cast iron (only with G ½, 1, 2)	2
Steel, mat. No. 1.0254 (not with G ½, 1, 2)	3
Stainless steel, mat. No. 1.4571/316Ti	4
Connection type	
Adhesive bushing (only PVC)	1
Female thread DIN ISO 228	2
Female thread NPT	3
Connection size (see Tables page 4/223)	
Adhesive bushing	A
Female thread G¼	B
Female thread G¾	C
Female thread G½	D
Female thread G¾	E
Female thread G1	F
Female thread G1¼	G
Female thread G1½	H
Female thread G2	J

Ordering data	Order No.
SITRANS F VA variable area meter	
Type Trogflux	
Plastic flow tube	
Trogamid	7ME5801-
Polysulfone	7ME5806-
	
Contacts	
(only with magnetic float, see next data position)	
Without contact	A
Contact K18/A (closes when limit is fallen below)	C 1
Contact K18/B (closes when limit is exceeded)	D 1
2 contacts K18/A	E 1
2 contacts K18/B	F 1
1 per contact K18/A and K18/B	G 1
Float version	
Standard	0
With magnet	1
Guided	2

Further designs	Order code
Please add "-Z" to Order No. and specify Order code(s).	
With calibration certificate	B06
Measured medium	Y01
Always required, specify in plain text: Medium, measuring range with dimension, density with dimension, viscosity with dimension, operating temperature, operating pressure	
Silicone-free version	Y04
Medium: water	Y05
Viscosity: 1 mPa·s (cp) Density: 1 kg/l (62.43 lb/cu.ft)	
Special version: specify in plain text	Y99

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