ProFlow

PRODUCT BULLETIN 142

Vane Meters

Special versions

This brochure comprises only VAF Instruments standard delivery program. Special flowmeter variants can be offered as tailor-made solutions. Consult VAF Instruments for further information.

Introduction

VAF Instruments ProFlow positive displacement sliding vane type liquid flowmeters are used in continuous metering applications of oil-like liquids, especially for accurate measurement of fuel oil consumption.

ProFlow flowmeters have a simple, rugged design. With only few almost frictionless moving internal parts there is hardly any wear in the flowmeter which safeguards a typical long lasting lifetime. ProFlow meters have no mechanical seals saving you from regular maintenance and possible leakage of process liquids into the environment. The flowmeter is driven by the process liquid which makes it suitable for distant locations without power supply.

The high accuracy of the flowmeter (down to 0.2% and repeatability 0.05%) is not influenced by process pressure or temperature, mechanical pipe strain or liquid turbulence and therefore straight inlet and outlet pipe pieces are not required.

Experience in flow measurement

In 1938 VAF Instruments started as a manufacturer of petrol delivery pumps. The flowmeters made by VAF for this pump already had to have the highest accuracy and had to meet the demands of the board of weights and measures.
Innovation and research over the past 65 years helped VAF to make new types of flowmeters bearing in mind customer requirements and the need for accurate flow measurement.
VAF Instruments flowmeters are available in sizes from 8 mm up to 300 mm (1 l/hr up to 960 m^3/hr). ProFlow flowmeters cover the middle part of this range.

Available ProFlow flowmeters

ProFlow flowmeters are available in connection sizes from 15 mm up to 50 mm representing maximum flow ranges from 50 l/min up to 500 l/min. For registration of the measured amount of liquid VAF ProFlow meters can be fitted with non resetable counter and pulse transmitters.

Liquids

VAF positive displacement flowmeters Series ProFlow are specially developed for measurement of all kinds of hydrocarbon liquids in particular medium and heavy fuel oils for combustion engines, lubricating oils and many other oil-like liquids.

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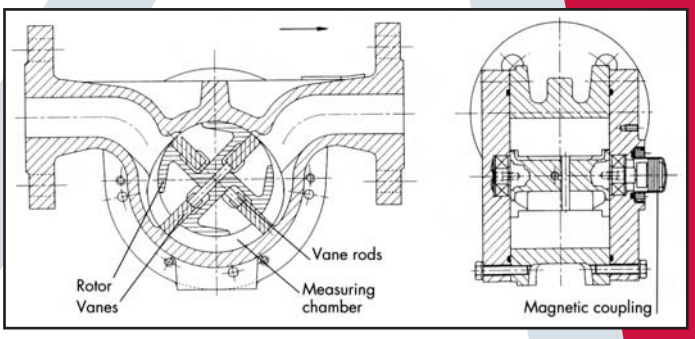
Principle of operation

Series ProFlow flowmeters operate on the sliding vane principle. The meter consists of a specially shaped housing in which a rotor can rotate freely. Two pairs of vanes are placed into four slots in the rotor. Each pair is positioned by a rod and can move in and out of the rotor. The radial vane movement is guided by the special inner shape of the housing.

This patented construction provides a constant seal between the inlet and the outlet of the meter. The incoming liquid forces the rotor to rotate. A magnetic coupling transmits the rotor rotations from the measuring chamber to a built-on counter (standard). An electric pulse transmitter can be installed as option for remote totalising or flow data processing.

Optional
An electric counter can be installed for accumulated totals, resetable total and flowrate.



Sectional view of ProFlow meter.

Benefits

- No need for external viscosity and specific gravity settings. A single meter model is suitable for different liquids and various physical conditions.
- Standard VAF meters are suitable for a wide viscosity range without affecting the calibrated accuracy within the specified measuring range.
- Easy and consequently low-cost customer maintenance and service because of simplified construction and lesser internal parts.

Features

- Conforms to PED directive 97/23/EG.
- NEN-EN-ISO 9001-2000 quality assurance.
- Material certificate according EN 102043.1B can be provided.
- Flow range up to 1:100.
- Measuring tolerance better than +/- 0.2% of the actual flow for a measuring range of 1:10; better than +/- 0.3% for a measuring range of 1:20.
- Reproducibility better than +/- 0.05%.
- Non-pulsating measuring principle.
- Low pressure drop.
- Self-cleaning properties prevent sediment depositing on inner parts of the flowmeter.
- Optional electric pulse frequency transmitter to provide control signals for further processing instrumentation.

Applications

- Fuel consumption measurement of internal combustion engines and oil burners.
- Injection of oils.
- Measurement of fluid movement in hydraulic systems.
- Accurate measurement of viscous fluids at low flow rates, etc., etc.

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Technical specification

Basic model number	B5015	B5023	B5025	B5040	B5050
Connection size	DN 15 mm (½″)	DN 25 mm (1″)	DN 25 mm (1″)	DN 40 mm (1.5″)	DN 50 mm (2″)
Capacity	see table and graphs on pages 4 and 5				
Displaced volume per revolution (litres)	0.025	0.025	0.167	0.167	0.40
Measuring accuracy range 1:10 [1] range 1:20 [2]	0.2% 0.3%				
Repeatability	better than +/- 0.05%				
Required starting pressure	3 kPa (0.03 bar)				
Materials Body, flanges and covers Rotor Vanes O-rings	ductile iron ductile iron carbon Viton A				
Body pressure rating, kPa (bar)	4,000 (40)		2,500 (25)		2,000 (20)
Available flanges	DIN PN 6, 10, 16, 25, 40; raised face or with groove acc. DIN 2512N ANSI class 150, 300 JIS 5, 10, 16, 20 K		DIN PN 6, 10, 16, 25; raised face or with groove acc. DIN 2512N ANSI class 150, 300 JIS 5, 10, 16, 20 K		
Liquid temperature range	standard -15 to 125°C; max. 180°C on application				standard -15 to 125°C; max. 160°C
Built-on counter	6- digit non-resetable totaliser Ex II 2 G EEx ia IIC T6...T3 (depending on medium temperature)				
Smallest readout unit Red pointer Counter	0.1 litre, 0.001m³ 1 litre, 0.01m³		0.001m³ 0.01m³		0.001m³ 0.01m³
Optional inductive pulse transmitter Protection class	1 or 2 per flowmeter DIN 19234(NAMUR) PTB No.99 ATEX 2219X and CENELEC EEx-ia IIC T6...T4				
Calibrated pulses per litre In combination with counter	0.1, 0.5, 1, 5, 10, 40, 50, 80, 100, 200, 400, 800, 1000		0.1, 0.5, 1, 6, 12, 30, 60, 120, 150		0.1, 0.5, 1, 2.5, 5, 10, 12.5, 25, 50, 62.5
With PulsBox only	40, 80, 200, 400, 800, 1000, 2000		6, 12, 30, 60, 120, 150, 300		2.5, 5, 12.5, 25, 50, 62.5, 125
Weight (kg)	5	7	12	14	22

[1]) Standard factory calibration [2]) Calibration on request

Flow ranges

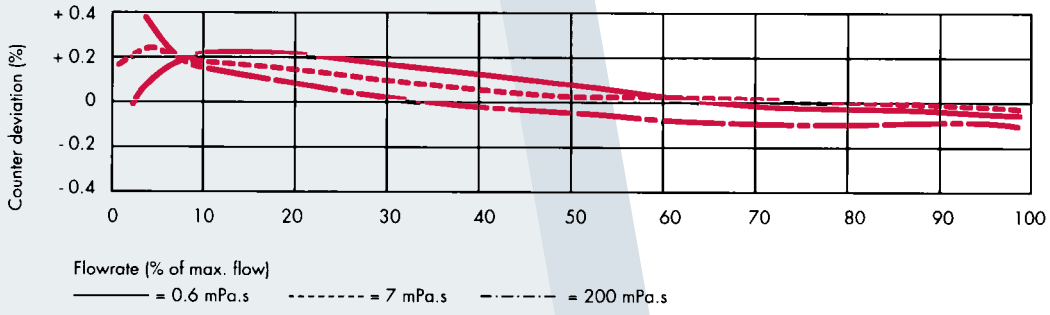
To select the appropriate meter size for your process condition the graphs on page 4 must be used. The graphs show the pressure drop across the flowmeter as a function of the flow rate and the viscosity of the liquid. The sloping lines are lines of equal pressure drop.

Then find the minimum flow in the table below. The data in this table only refer to standard flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3,000 mPa.s. Lower minimum capacities are possible dependent on liquid viscosity and required measuring accuracy.

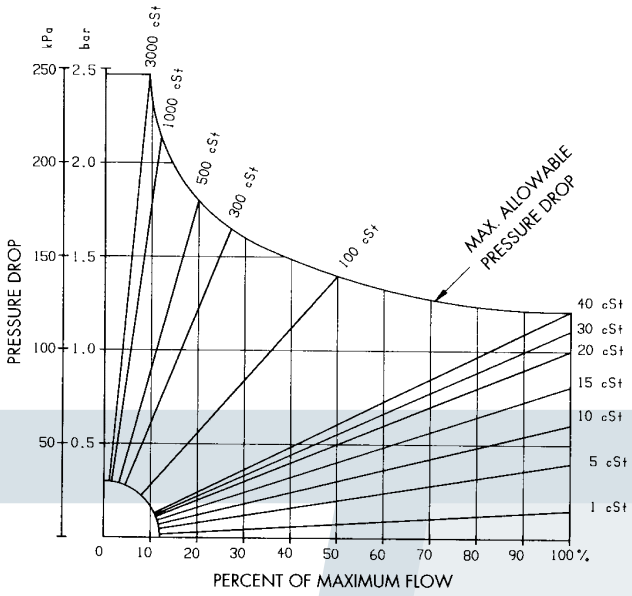
Meter Size (DN)	Model No.	Viscosity (mPa·s)	1-5	5-100	100-300	300-1000	1000-3000
		Capacity in litres/min					
15 mm (1/2″)	B5015	minimum	2.5	1.5	0.5	0.1	0.02
25 mm (1″)	B5023	minimum	2.5	1.5	0.5	0.1	0.02
25 mm (1″)	B5025	minimum	3.2	1.5	0.6	0.2	0.06
40 mm (1 .5″)	B5040	minimum	5	2.3	1	0.3	0.1
50 mm (2″)	B5050	minimum	10	4.6	2	0.6	0.2

Typical calibration curves

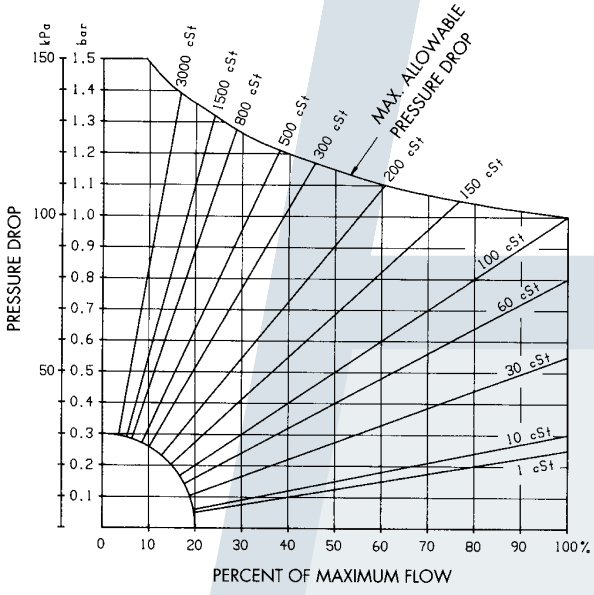
VAF Instruments flowmeters perform liquid measurement with the highest accuracy. This graph shows typical calibration curves for liquids with different viscosity's. Consult the factory for other values.



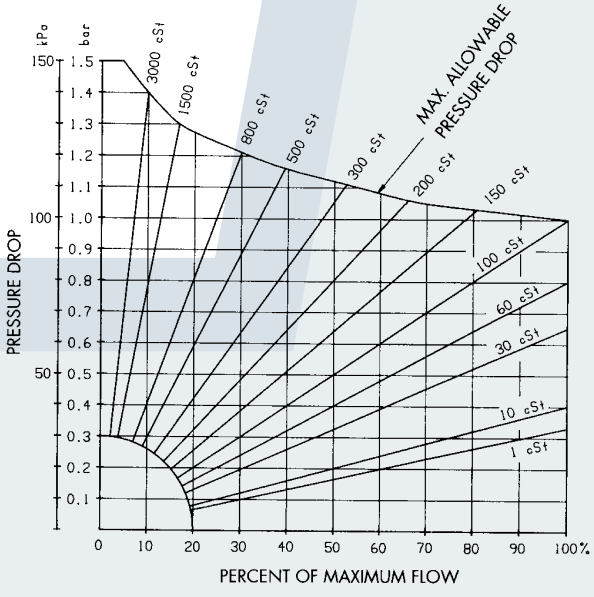
Flowrate-pressure drop-viscosity relation



Models B5015/B5023
100% = 50 l/min



Model B5025 100% = 160 l/min
Model B5040 100% = 250 l/min



Model B5050 100% = 500 l/min

Options and accessories

Counters and pulse transmitters

Consult VAF Instruments for special counters and pulse transmitters not mentioned in this brochure.

Liquid filter

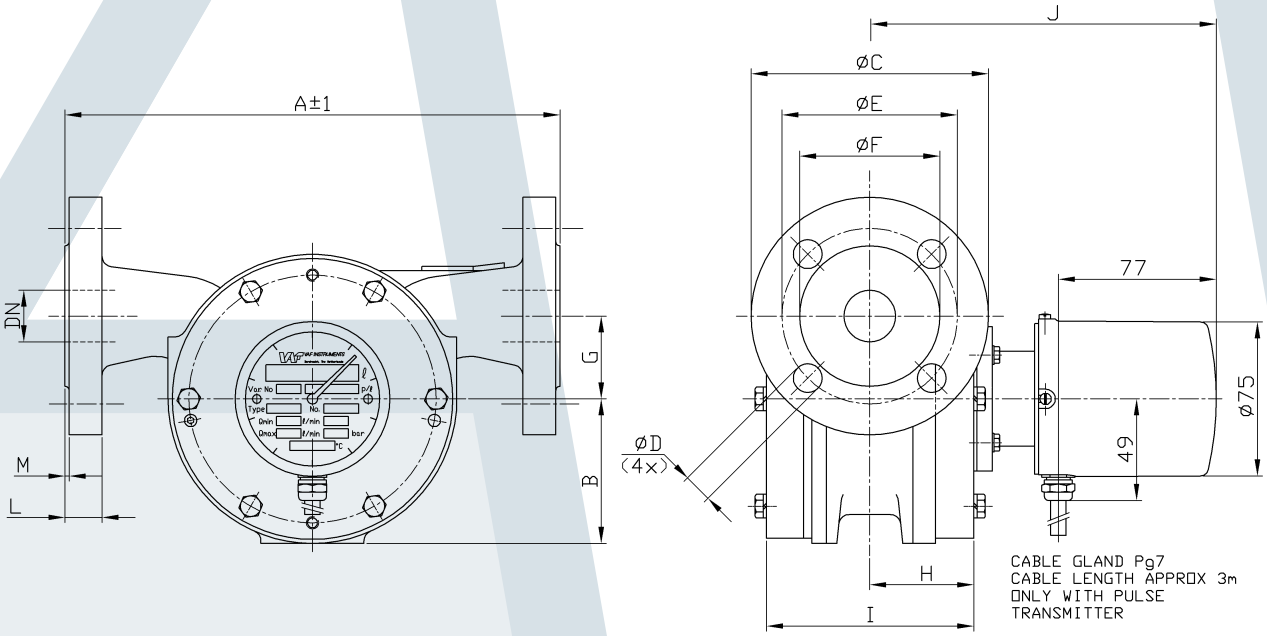
The process liquid must be clean and free from air, gas or dirt. Solid particles may cause excessive wear. It is recommended to install a liquid filter with a mesh width of < 0.05 mm (280 mesh at the inlet of the flowmeter. If necessary also install a suitable deaerator.

Electronic signal processing instrumentation

A complete range of microprocessor based, analogue and digital electronic instruments for indicating, totalising, registering and controlling liquid flows are available as modular plug-in units or in housings for wall or flush panel mounting.

Dimensions

Dimensions in millimetres for flowmeters with DIN flanges.
Dimensions of meter versions not shown here are available on application.



Meter type	Connection size	A	B	øC	øD	øE	øF	G	H	I	J	L	M
B5015	DN 15 mm (1/2")	180	50	95	14	65	45	24	33	70	151	16	2
B5023	DN 25 mm (1")	220	50	115	14	85	68	24	33	70	151	18	2
B5025	DN 25 mm (1.5")	240	70	115	14	85	68	40	51	101	168	18	2
B5040	DN 40 mm (1.5")	240	70	153	18	110	88	40	51	101	168	21	3
B5050	DN 50 mm (2")	260	85	165	18	125	102	50	72	143	189	22	3

Flanges ratings DIN

Ordering information

For proper selection of the suitable flowmeter the following data should be determined:

Fluid data

1. Process liquid (trade name or chemical composition): _____

2. Flow rate (l/min): minimum _____ ; continuous _____ : max. discontinuous _____

3. Operating pressure range (bar): _____

4. Allowable pressure drop (bar): _____

5. Operating temperature range (°C): _____

6. Specific gravity at operating conditions: _____

7. Viscosity at operation conditions: _____

Flowmeter data
Check ☑ as required☒

8. Basic model number (see page 3): _____

9. Connections: ❑ DIN flanges ❑ ANSI flanges ❑ JIS flanges

10. Directions of flow: ❑ left to right ❑ right to left ❑ top to bottom bottom to top

11. Optional pulse transmitter (see 'Technical Specification' table on page 3):

❑ Required ❑ Not required

❑ No. of inductive pulse generators: ❑ 1; ❑ 2;

❑ No. of pulses/litre: _____

Options and accesoiries

12. Special certification
❑ material certificate according EN 10204 3.1B
❑ acc. PED 97/23/EG,
❑ standard factory accuracy calibration certificate

13. Accesoiries
❑ liquid filter
❑ electronic signal processing instrumentation *)
❑ other options or accesoiries *)

*) Specify your requirements

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