MidFlow®
Model PT

PRODUCT BULLETIN 135

Sliding Vane Meters DN 25 - 50 (1″, 1 1/2″, 2″)

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.

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Introduction

VAF Instruments MidFlow® Model PT positive displacement sliding vane type liquid flowmeters are used in continuous metering applications, in-line blending processes and batch applications,
MidFlow® Model PT 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. MidFlow® Model PT 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 0.1% 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 60 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 m3/hr). MidFlow flowmeters cover the middle part of this range.

Available MidFlow® Model PT flowmeters

MidFlow® Model PT flowmeters are available in connection sizes from 25 mm up to 50 mm representing maximum flow ranges from 160 l/min up to 500 l/min. The VAF MidFlow® Model PT flowmeter is designed especially for fuel consumption measurement under difficult circumstances e.g. on board of ships.
These flowmeters can be equipped with a built-in PT100 temperature sensor as an option. This temperature signal can be used e.g. to calculate temperature compensated fuel consumption.

Liquids

Other available models of VAF positive displacement flowmeters are suitable for a wide range of liquids.
Because liquids with higher viscosity's do not degrade the accuracy of the sliding vane flowmeter, it is possible to use only one flowmeter for various liquids. MidFlow meters are used for acids, alkalines, cleansing liquids, solvents, water, edible oils and fats, liquor, glucose, paint, all petrochemical liquids from LPG to bitumen, alcohol, printing ink, glue, salt solutions, and many other organic and inorganic liquids.

Consult factory for the selection of the suitable model.

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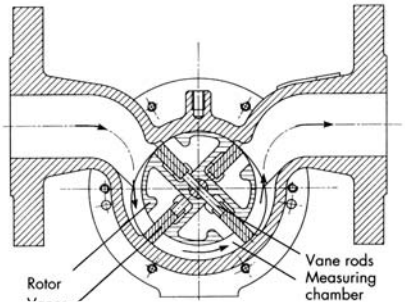
Principle of operation

VAF Instruments positive displacement 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 movement of the vanes 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.

The rotation of the rotor is transferred via a reedswitch mounted in the cover. This reedswitch can only be used for the remote read out, flow data processing or connection to a process computer. As an option the fluid temperature can also be measured by an integrated PT100 sensor.



Sectional view of MidFlow® Model PT meter.

Features	Benefits
High capacity and rangebility	• One meter for a wide range of flows • Lower investment
High accuracy (up to +/- 0.1%)	• Exact registration of transferred amount of liquid • No loss of valuable raw material
Design simplicity	• Easy to service • No complex replacement parts • Low operation cost
Accuracy not degraded by: process pressure process temperature liquid viscosity liquid conductivity pipe strain flow pattern (turbulence)	• Easy to operate because no need for external settings saving time in operation and training • One single meter model is suitable for different liquids lower investment • No straight pipe require before or behind meter lower system investment and less space required
Compact design	• Easy to integrate in compact systems • Space saving
Certified by European Classification Authorities (E.E.C. - approval) for custody transfer applications	• Calibration according standard procedures • Time saving
Constructed to NACE and CE standards	• No special adjustments necessary
From ISO 9001:2000 registered company	• Assured product quality
Materials certificate acc. EN 10204.3.1B available as standard	• Standard procedures • Time saving
Few internal parts	• Less wear • Long lifetime • Low operation cost
Measurement driven by liquid	• No auxillary power needed • Suitable for many remote locations

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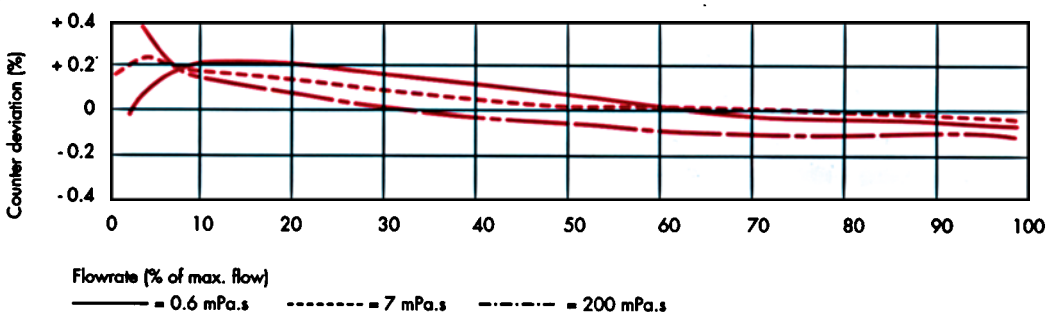
Features and benefits

Standard VAF meters include design features that other models only offer at extra cost; thus saving on initial purchasing price.

Typical calibration curves

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



Technical specification

Basic model number	J5025 PT	J5040 PT	J5050 PT
Connection size, DN [mm]	25	40	50
Capacity	See graphs on page 3		
Displaced volume per revolution [litre]	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 [kPa (bar)]	3 (0.03)		
Materials Body & flanges	Ductile iron		
Rotor	Ductile iron		
Vanes	Carbon		
O-rings	Viton A PFA covered Viton A or Kalrez on application		
Bearings	Steel ball bearings Stainless Steel (1,4125) ball bearings on application		
Body pressure rating [kPa (bar)]	2,000 (20)		
Available flanges DIN	PN 10, 16, 25; raised face or with groove acc. DIN 2512N		
ANSI class	150, 300		
JIS	5, 10, 16, 20 K		
Liquid temperture range Standard - High-temperature version	-15 to 150°C		
Nominal pulse output	12 P/l	12 P/l	5 P/l
PT100 output (optional)	Class B		
Weight without counter [kg]	13	16	24

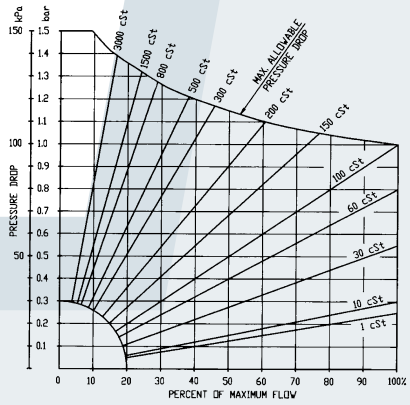
Notes: 1) Standard factory calibration. 2) Calibration on request. 3) For 300 lbs flanges on 100 mm models consult factory

Flow ranges

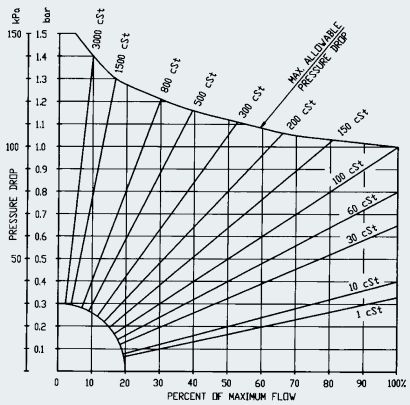
To select the appropriate meter size for your process the graphs on this page must be used.The data in these graphs only refer to standard flow-meters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3,000 mPa·s. Lower minimum capacities are possible dependent on liquid viscosity and required measuring accuracy.

Flowrate - pressure drop viscosity relation

These graphs show the pressure drop across the flowmeter as a function of the flowrate and the viscosity of the liquid. The sloping lines are lines of equal viscosity. The curve at the top of the graphs represents the maximum allowable pressure drop.



Meter size DN 25 mm: 100% = 160 l/min
Meter size DN 40 mm: 100% = 250 l/min



Meter size DN 50 mm: 100% = 500 l/min

Applications

Some of the many applications are:

- Fuel consumption measurement of diesel engines and oil burners.
- Measurement of liquid movement in hydraulic systems.
- Accurate measurement of viscous liquids at low flow-rates.
- etc., etc.

Options and accessories

- Material certificate acc. EN 10204.3.1 B.
- Liquid filters and deaerators.

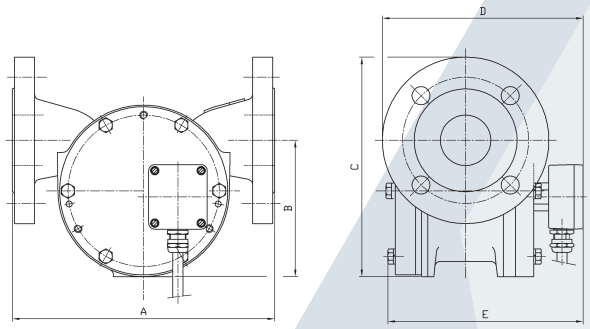
Liquid filter/Airvent.

Appropriate liquid filtering is essential for protection of the flowmeter.

Dimensions

All dimensions apply to flowmeters with DIN PN 10/16/25 flanges.

- Build-in dimensions of flowmeters with other pressure ratings are available on application.
- Except where noted all dimensions are in millimetres.



Basic model number	J5025 PT	J5040 PT	J5050 PT
Connection size	DN 25	DN 40	DN 50
A =	240	240	260
B =	110	110	135
C =	168	185	218
D =	157	174	200
E =	155	172	198

Quotation and ordering information

For proper selection of the suitable MidFlow® Model PT meter the following data should be determined:

Liquid data:

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

2. Flowrate (l/min): minimum _____ continuous _____ maximum _____
3. Operating pressure range (bar): _____ Allowable pressure drop (bar): _____
4. Operating temperature range (°C): process liquid _____ ambient _____
5. Specific gravity at operating conditions: _____ Viscosity at operating conditions: _____

Flowmeter data:

6. Basic model number (see page 3): _____
7. Diameter liquid piping: _____
8. Wetted parts material: ❑ ductile iron
9. Connection flanges: ❑ DIN PN .....bar ❑ ANSI RF.....lbs ❑ JIS.....K
10. Direction of flow: ❑ left to right
11. Output: ❑ Pulse output ❑ Pulse output + PT 100 SIGNAL
13. Liquid filter ❑ required ❑ not required
14. Special certification: ❑ inspection by customer ❑ standard factory calibration
    ❑ inspection by classification authority: _____
    ❑ factory test and materials certificate acc. EN 10204.31 B
    ❑ other: _____
15. Tagging ❑ paper tag ❑ stn. stl. tag fixed to flowmeter
16. Other options and accessories: _____

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Agents and distributors in more than 50 countries

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