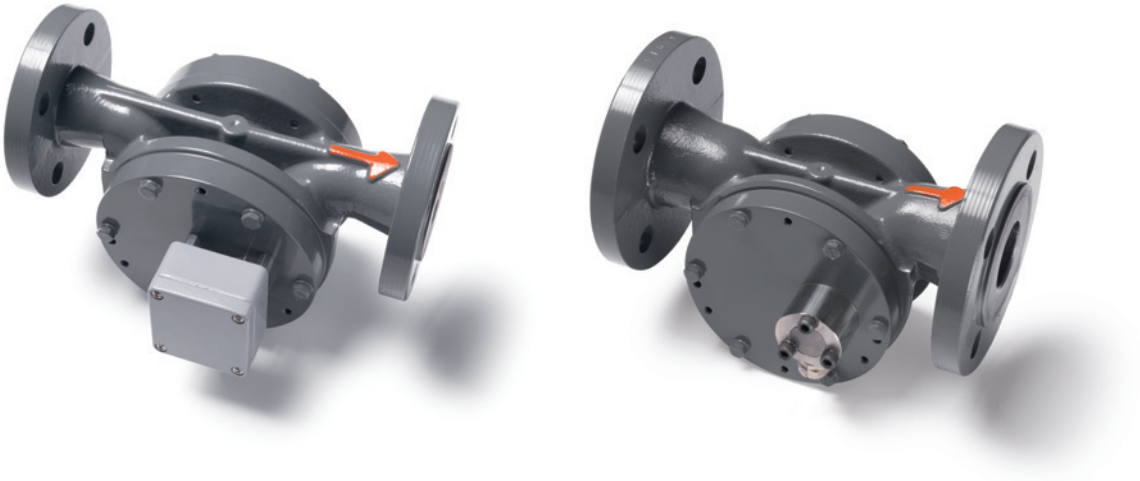
VAF

INSTRUMENTS



LoFlow®/MidFlow®

Model PT / Fuel Oil Flowmeters

Sliding Vane Meters DN 15-50 (½"-2")

135

Product Bulletin

WWW.VAF.NL

TO BE REALLY SURE

Introduction

VAF Instruments LowFlow®/MidFlow® Model PT positive displacement sliding vane type liquid flowmeters are used in continuous metering applications. 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. 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 0,2% 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 Instruments 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 75 years helped VAF Instruments 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).

Available PT flowmeters

PT 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. The VAF PT flowmeters are designed especially for fuel consumption measurement under difficult circumstances e.g. on board of ships.

Liquids

Other available models of VAF Instruments positive displacement flowmeters are suitable for a wide range of liquids. Because liquids with higher viscosities do not degrade the accuracy of the sliding vane flowmeter, it is possible to use only one flowmeter for various liquids. PT flowmeters 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. VAF PT flowmeters can be delivered with various combinations of counters/flow computers. Refer to Product Bulletin AB-124 for Fuel Consumption Measurement. Consult our factory for the selection of the suitable model.

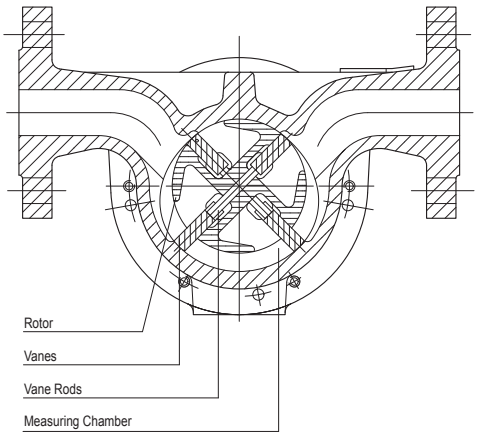
Special versions

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.

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 reed switch or a Hall switch mounted in the cover. This switch can be used for remote read out, flow data processing or connection to a process computer.



Sectional view of a PT meter.

Features & benefits

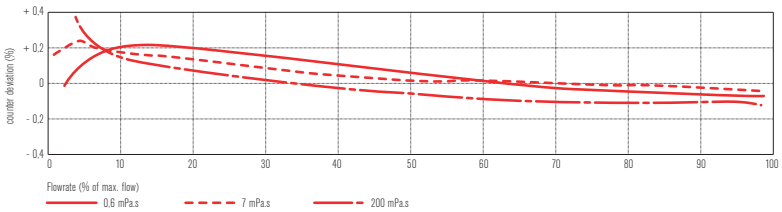
Standard VAF meters include design features that other models only offer at extra cost; thus saving on initial purchasing price.

Features	Benefits
High capacity and rangeability	One meter for a wide range of flows
	Lower investment
High accuracy (down to ± 0,2%)	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, thus saving time in operation and training
	One single meter model is suitable for different liquids resulting in a lower investment
	No straight pipe required before or behind meter thus less space required
Compact design	Easy to integrate in compact systems
	Space saving
Constructed to CE standards	No special adjustments necessary
From an ISO 9001 registered company	Assured product quality
Few internal parts	Less wear
	Long lifetime
	Low operation cost
Measurement driven by liquid	No auxiliary power needed
	Suitable for many remote locations

Technical specification

Typical calibration curves

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



Basic model number	**J5015PT**	**J5023PT**	**J5025PT**	**J5040PT**	**J5050PT**
Connection size [mm]	DN 15	DN 25	DN 25	DN 40	DN 50
Capacity [l/min]	see graphs				
Maximum, 8 hrs/day discontinuous	50		160	250	500
Maximum, continuous	37,5		120	190	380
Displaced volume per revolution [liters]	0,025		0,167	0,167	0,40
Measuring accuracy					
Range 1:10 [1] better than	± 0,2%				
Range 1:20 [2] better than	± 0,3%				
Repeatability better than	± 0,05%				
Required starting pressure [kPa (bar)]	3 (0,03)				
Materials					
Body and flanges	ductile iron				
Rotor	ductile iron				
Vanes	carbon				
O-rings	Viton A				
Bearings	steel ball bearings				
Body pressure rating [kPa (bar)]	4000 (40)		2000 (20)		
Available flanges					
DIN [bar]	PN 10, 16, 25; raised face or with groove acc. DIN 2512N				
ANSI	150, 300				
JIS [K]	5, 10, 16, 20				
Liquid temperature range	-10 to 100°C (reed)/-10 to 150°C (Hall)				
Nominal pulse output	160 p/l		12 p/l	12 p/l	5 p/l
PT100 output	class B				
Weight [kg]	6	7	13	16	24
Type of pulse transmitter [3]	Hall switch		reed switch (model PT) or Hall switch (model PT2)		

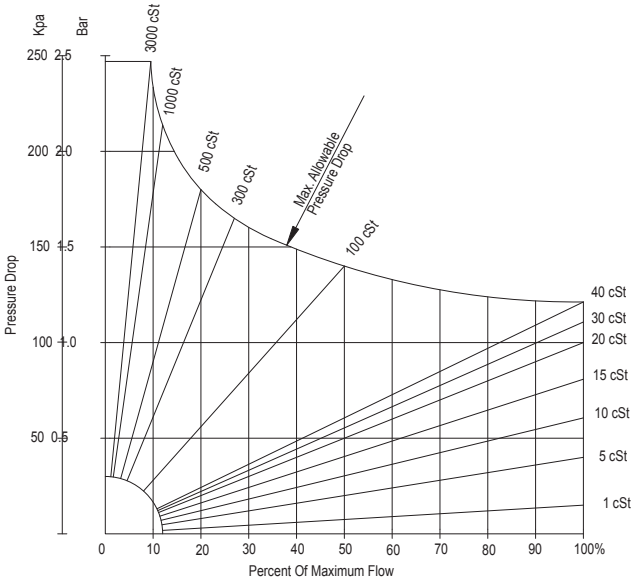
Notes: [1] Standard factory calibration. [2] Calibration on request. [3] Typical applications for reed switch based flowmeters are flowmeters operating in cold fluids at relatively low speed or in combination with battery operated process computers. Typical applications for Hall switch based flowmeters are flowmeters operating in hot fluids or at continuous high speed. Please contact factory for more information or other applications. Please note that a Hall switch requires power supply to the sensor, which is not possible with battery operated process computers.

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 flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3000 mPa.s. Lower minimum capacities are possible depending on liquid viscosity and required measuring accuracy.

Flowrate - pressure drop viscosity relation

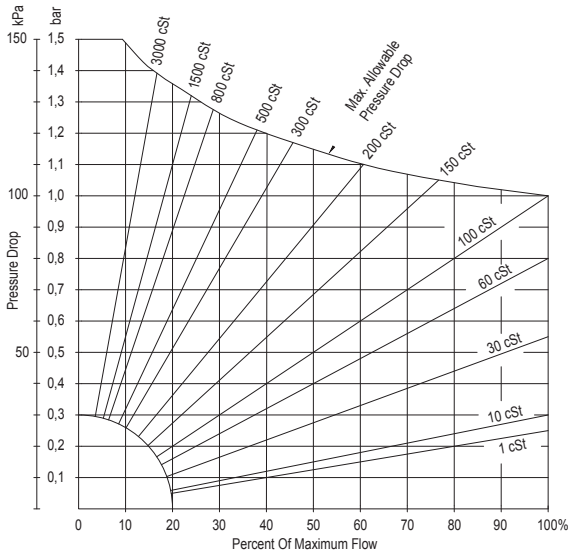
These graphs show the pressure drop across the flowmeter as a function of the flowrate and the viscosity of the liquid. The sloping lines are lines of equal viscosity. The curve at the top of the graphs represents the maximum allowable pressure drop.



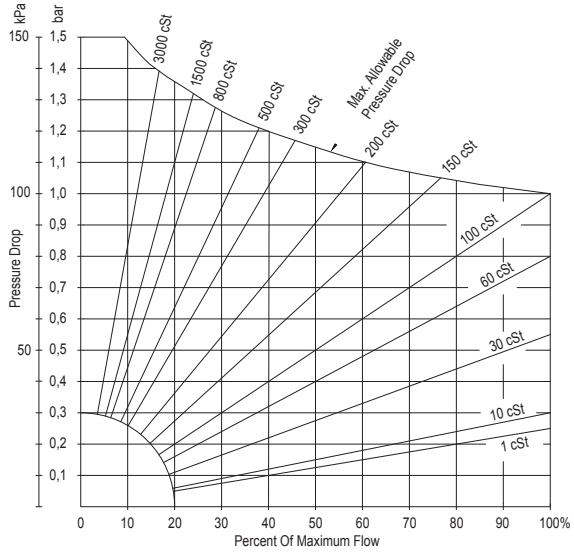
J5015PT, J5023PT: 100% = 50 l/min

Not recommend for use in HFO installations.

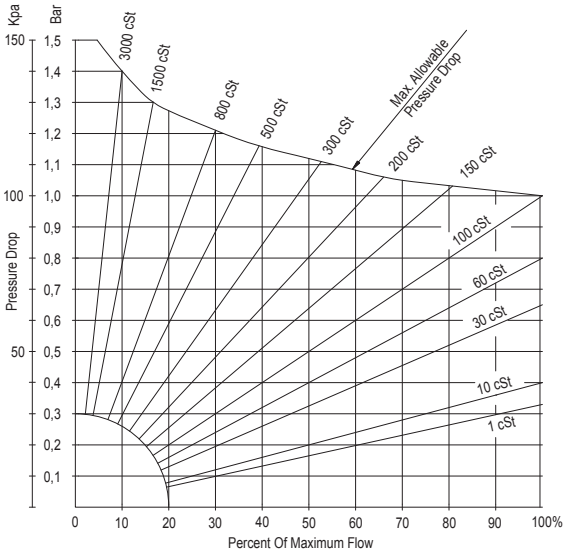
For applications involving HFO we advise our DN25 size flowmeters



J5025PT: 100% = 160 l/min



J5040PT: 100% = 250 l/min



J5050PT: 100% = 500 l/min

Options and accessoires

Flow computers and totalisers

Fuel consumption measurement can be performed in engine-driven installations in all kinds of power and propulsion plants. Various types of fuel can be measured, such as heavy fuel oil, diesel oil or bio-oil. Depending on the type of fuel system it is necessary to have one, two or three flowmeters installed and it might also be necessary to compensate the measured volume for temperature differences in the system.

For further insight in fuel consumption please refer to Application Bulletin AB-124 Fuel Consumption Measurement.

Liquid filter/Airvent

Appropriate liquid filtering is essential for protection of the flowmeter.

FCM 2

(Fuel Consumption Monitor, for use with one or two flowmeters)

Typical screen shot examples of PEM 3 (Propulsion Efficiency Monitor)

(When VAF flowmeters and Torque/Thrust sensors are combined)

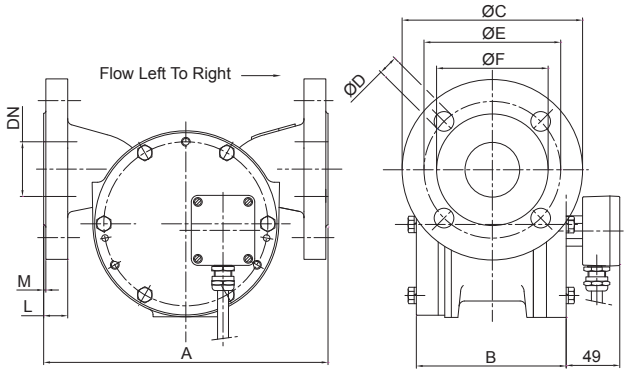
Applications

Some of the many applications are:

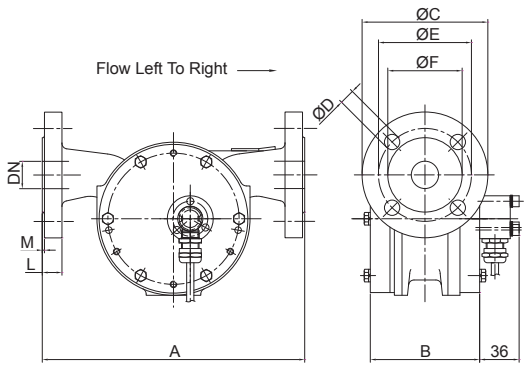
- Fuel consumption measurement of diesel engines and oil burners;
- Measurement of liquid movement in hydraulic systems;
- Accurate measurement of viscous liquids at low flowrates.

Dimensions

Built-in dimensions of flowmeters with other pressure ratings are available on application.
All dimensions are in millimeters. Other dimensions depend on flange type, see TIB-136 or TIB-144 for detailed information.



PT



PT2

Basic model number PT / PT2	J5015	J5023	J5025	J5040	J5050
Connection size	DN 15	DN 25	DN 25	DN 40	DN 50
A	180	220	240	240	260
B	95	72	100	100	137
Note: J5015 and J5023 only available in PT2 configuration					

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Quotation & ordering information

	For proper selection of the suitable 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.	**Viscosity at operating conditions** [cSt]**:**		
	Flowmeter data:		
6.	**Basic model number:**		
7.	**Diameter liquid piping:**		
8.	**Wetted parts material:**	ductile iron	
9.	**Connection flanges:**	◯ DIN PN [bar] ◯ ANSI RF [lbs] ◯ JIS [K]	
10.	**Direction to flow:**	left to right	
11.	**Output** [1]	◯ pulse output (Hall switch) + PT100 ◯ pulse output (reed switch) ◯ pulse output (reed switch) + PT100	
12.	**Liquid filter:**	◯ required ◯ not required	
13.	**Certification:**	◯ inspection by customer	
		◯ inspection by classification authority:	
		◯ factory test and material certificate acc. EN 10204 3.1	
		◯ other:	
14.	**Tagging:**	◯ paper tag ◯ stn. stl. tag fixed to flowmeter	
15.	**Other options and accessories:**		

Notes: [1] J5015/J5023 Hall switch only

Name:

Place and date:

For further information see relevant Product Bulletins
or www.vaf.nl

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