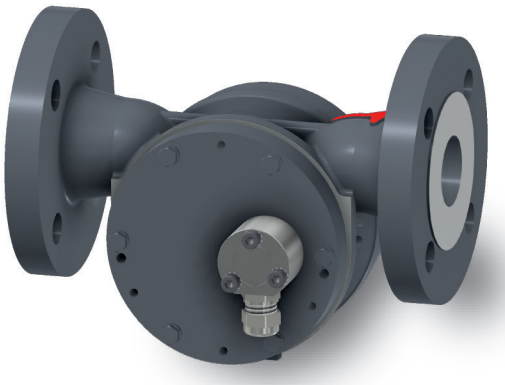
VAF

INSTRUMENTS



# LoFlow®/MidFlow®

**Model PT2** / Fuel Oil Flowmeters

## Sliding Vane Meters DN 15-50 (½"-2")

135

Product Bulletin

WWW.VAF.NL

TO BE REALLY SURE

# Introduction

VAF Instruments PT2 positive displacement sliding vane type liquid Flowmeters are used in continuous metering applications.
PT2 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. PT2 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 78 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 PT2 flowmeters

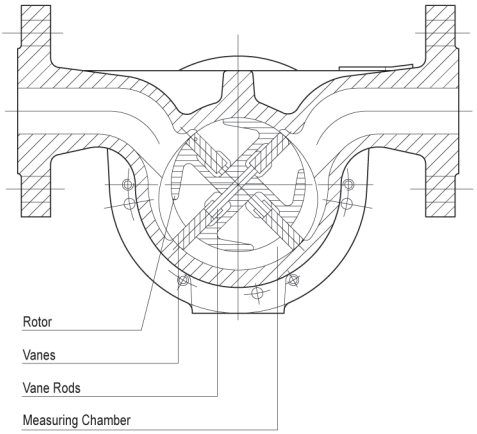
PT2 Flowmeters are available in connection sizes from 15 mm up to 50 mm representing maximum flow ranges from 50 l/min up to 500 l/min. The VAF PT2 Flowmeters are designed especially for fuel consumption measurement under difficult circumstances e.g. on board of ships.

## 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. PT2 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 Instruments PT2 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.

# 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 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 PT2 Flowmeter

# Features & benefits

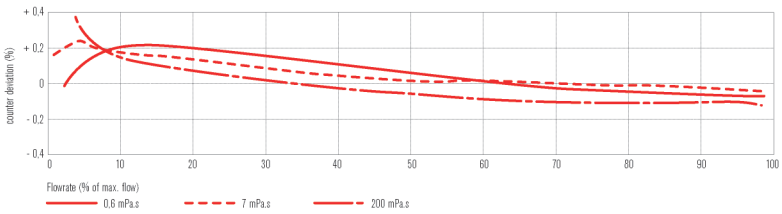
Standard VAF Instruments Flowmetersmeters include design features that other models only offer at extra cost; thus saving on initial purchasing price.

| 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:** | easy to operate because no need for external settings, thus saving time in operation and training |
| process pressure / process temperature / liquid viscosity / liquid conductivity | one single meter model is suitable for different liquids resulting in a lower investment |
| pipe strain / flow pattern (turbulence) | 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** | **J5015PT2** | **J5023PT2** | **J5025PT2** | **J5040PT2** | **J5050PT2** |
|---|---|---|---|---|---|
| **Connection size** [mm] | DN 15 | DN 25 | DN 25 | DN 40 | DN 50 |
| **Capacity** | see graphs | | | | |
| Maximum, 8 hrs/day discontinuous (l/min) | 50 | | 160 | 250 | 500 |
| Maximum, continuous (l/min) | 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% | | | | |
| 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 | | | | |
| ANSI | 150, 300 | | | | |
| JIS [K] | 5, 10, 16, 20 | | | | |
| Liquid temperature range | -10 to 100°C / -10 to 150°C (Hall) | | | | |
| Type of pulse transmitter | Hall switch with active output | | | | |
| Nominal pulse output | 80 p/l | | 12 p/l | 12 p/l | 5 p/l |
| PT100 output | class B | | | | |
| Weight [kg] | 6 | 7 | 13 | 16 | 24 |

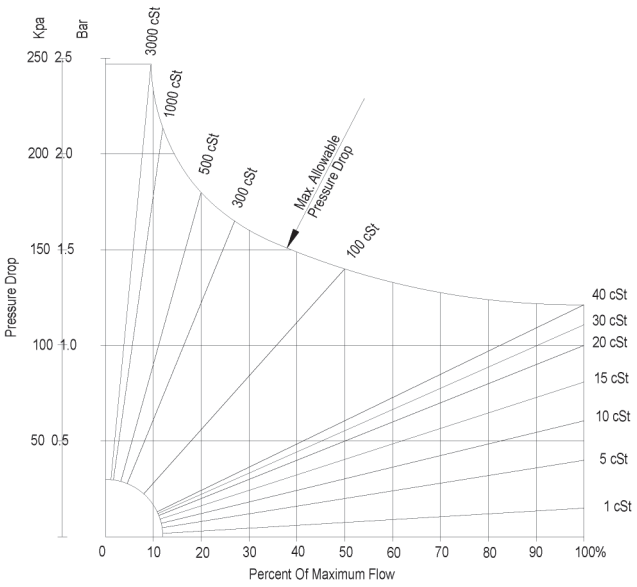
Notes:
[1)] Standard factory calibration 10% to 100% of maximum capacity.
[2)] Calibration on application

## Flow ranges

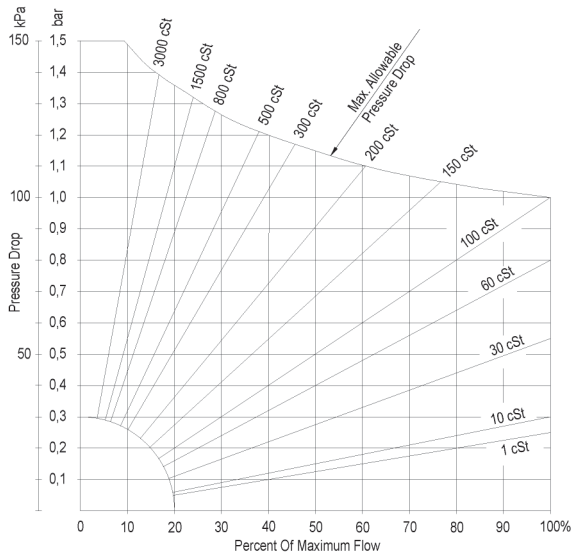
To select the appropriate meter size for your process the graphs on this page must be used. The data in these graphs only refer to standard Flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3000 mPa.s. Lower minimum capacities are possible depending on liquid viscosity and required measuring accuracy.

## Flowrate - pressure drop viscosity relation

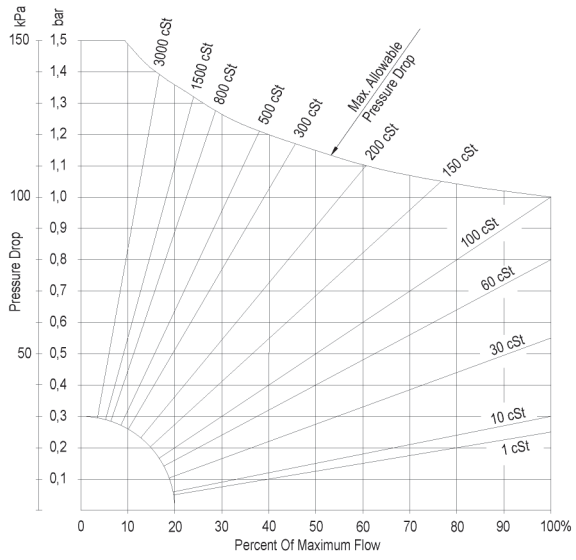
These graphs show the pressure drop across the Flowmeter as a function of the flowrate and the viscosity of the liquid. The sloping lines are lines of equal viscosity. The curve at the top of the graphs represents the maximum allowable pressure drop.



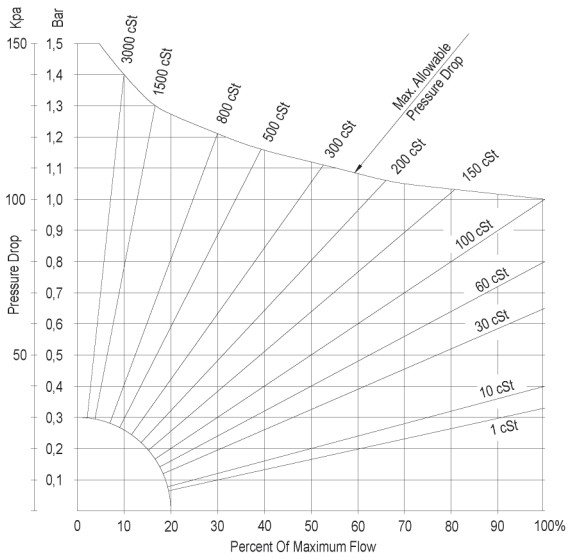

J5015PT2, J5023PT2: 100% = 50 l/min
*Not recommend for use in HFO installations.*
*For applications involving HFO we advise our DN25 size flowmeters*




J5025PT2: 100% = 160 l/min




J5040PT2: 100% = 250 l/min




J5050PT2: 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 or more 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

Appropriate liquid filtering is essential for protection of the Flowmeter.


Typical screen shot examples of PEM4 (Propulsion Efficiency Monitor)
(When VAF Flowmeters and Torque/Thrust sensors are combined)



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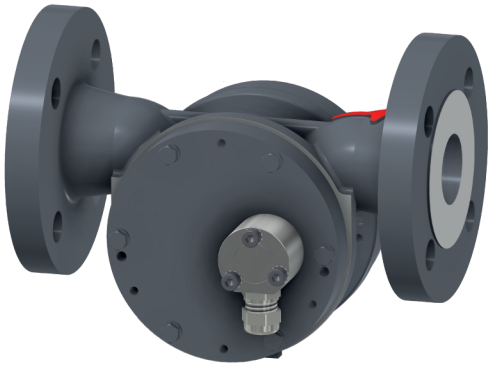
# Applications

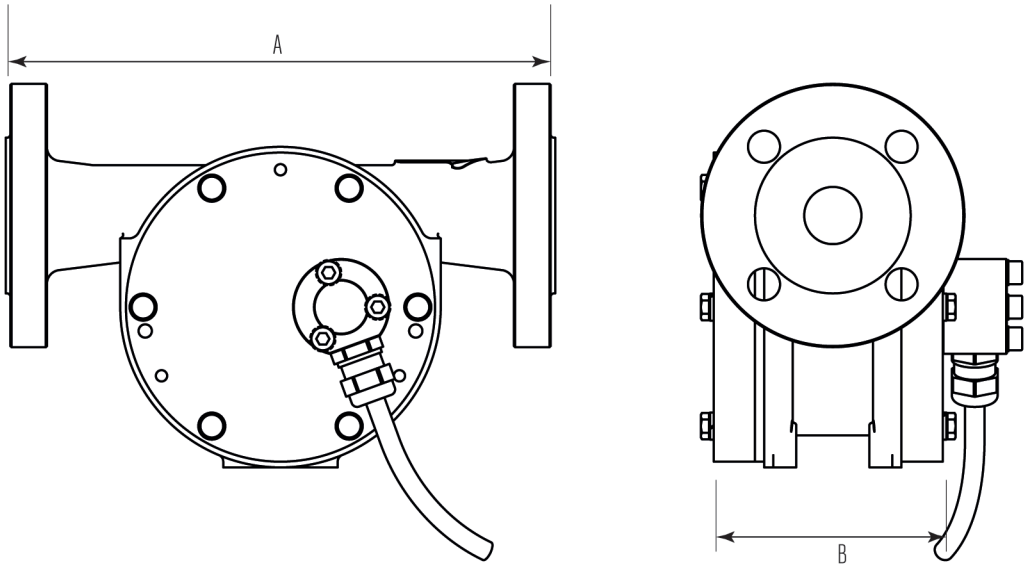
VAF Instruments PT2 Flowmeters in combination with the ViscoSense®3D, results in highly accurate and cost effective solution to measure mass flow for fuel consumption applications. Some of many other applications of VAF Instruments PT2 Flowmeters include:

- 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-144 for detailed information.




| Basic model number | J5015PT2 | J5023PT2 | J5025PT2 | J5040PT2 | J5050PT2 |
|---|---|---|---|---|---|
| Connection size | DN 15 | DN 25 | DN 25 | DN 40 | DN 50 |
| A | 180 | 220 | 240 | 240 | 260 |
| B | 95 | 72 | 100 | 100 | 137 |

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## Quotation & ordering information

| | | | |
|---|---|---|---|
| | For proper selection of the suitable PT2 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*** | ◯ pulse output (Hall 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:* J5015/J5023 Hall switch only | | |

Name:

Place and date:

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

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