HiFlow®

PRODUCT BULLETIN 132

Sliding Vane Meters DN 150 - 300 (6" - 12")

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.

HiFlow® is a registered trade mark of VAF Instruments B.V.

Introduction

VAF Instruments HiFlow® positive displacement flowmeters are used in continuous metering applications, in-line blending processes and batch applications, HiFlow® meters 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. HiFlow® 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 70 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). HiFlow® meters cover the high part of this range.

Available HiFlow® meters

HiFlow® meters are available in connection sizes from 150 mm up to 300 mm representing maximum flow ranges from
4600 l/min up to 16000 l/min. A choice of material is available with ductile iron, steel and stainless steel. For registration of the measured amount of liquid VAF HiFlow® meters can be fitted with various combinations of counters and pulse transmitters.

Liquids

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. HiFlow® 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.

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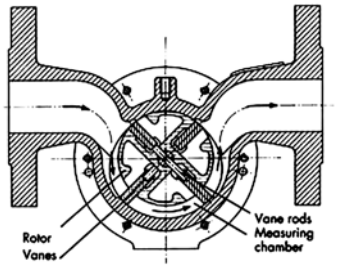
Principle of operation

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 magnetic coupling to a read out device. This can be a counter in any desired engineering unit or a pulse transmitter for remote read out, flow data processing or connection to a process computer.

Applications

Some of the many applications are:

- General batching, in-line blending and ratio control operations.
- Blending of additives in the process industries.
- Addition of catalysts to chemical reactors.
- Bunker reception and loading installations.
- Filling of tanks and drums.
- Coating of sheet material.
- Accurate measurement of viscous liquids at low flow rates.
- etc., etc.



Sectional view of HiFlow® 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 resulting in a 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
Local and/or remote registration standard counters and Ex pulse transmitters	• Standard flowmeter suitable for hazardous areas • No expensive adjustments needed for hazardous areas

Features and benefits

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

Counters, pulse transmitters and accesoiries

VAF HiFlow® meters can be fitted with various combinations of counters and pulse transmitters. All can be calibrated to read in litres, cubic meters or gallons. The following meter mounted counters and pulse transmitters are available:

7-digit resetable totaliser for simple totalising jobs. Direction of reading from the top of the flowmeter. An inductive pulse transmitter can be installed in the counter adapter as optional extra.

FlowCount rate totaliser. Fully programmable battery or loop powered LCD counter. Displays rate and accumulative and resetable totals. Optional with 4-20 mA output or flow alarm. Optional: Other models available e.g. batch controller.

Resetable flowmeter register for registering delivered or transferred quantities per job and in total. Optionally available with swivel adapter and with extention between meter body and counter. Combinations with pulse transmitters are possible.

Mechanical batch counter. Mechanical, electrical or pneumatic 2-stage knock-off. Optionally with swivel adapter and extention between meter body and counter. Combinations with pulse transmitters are possible.

Ticket printer. Records and prints liquid deliveries and transactions. For use with reset and preset counters
Accumulative or zero start models available.

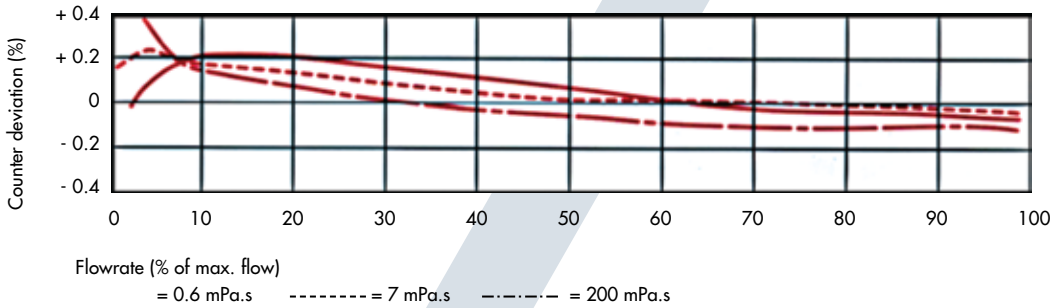
Flowrate/mass flowrate indicator for local read-out of litres/minute, kg/hour, % of maximum flowrate, or other engineering units.
An inductive pulse transmitter can be installed as optional extra.

Pulse transmitters for remote flow monitoring and control. Pulse generators used are inductive proximity switches acc. NAMUR DIN 19234 or incremental pulse encoders fitted to the resetable flowmeter register.

Pulse discriminator (dinrail mounting) to prevent pulse signal errors caused by pipeline vibrations and flow pulsations, or where other unsteady flow conditions would prevent smooth rotation of the meter. For use with 2 inductive pulse transmitters.

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.



Technical specifications

Z*= variable: if Z = 1, body material is carbon steel
if Z = 3, body material is 316 stainless steel
if Z = 5, body material is ductile iron

Basic model number	JZ*150	JZ*200	J5250	J5300
Connection size (DN) 1)	150 mm (6″)	200 mm (8″)	250 mm (10″)	300 mm (12″)
Capacity (l/min) 2)				
Maximum, 8 hrs/day discontinuous	4,600	8,000	12,500	16,000
Maximum, continuous	3,450	6,000	9,500	12,000
Minimum, range 1:10 3)	460	800	1,250	1,600
Minimum, range 1:20 4)	230	400	625	800
Displaced volume per revolution (liters)	11.9	29.3	58.6	
Measuring accuracy				
range 1:10	+/- 0.1%			
range 1:20	+/- 0.3%			
Repeatability	better than +/- 0.05%			
Required starting pressure	3kPa (0.03 bar)			
Materials Body and Covers	carbon steel ductile iron, AISI-316		ductile iron	
Vanes O-rings Ball bearings	carbon Viton A, PFA covered Viton A steel, stainless steel			
Body pressure rating, MPa (bar)				
Ductile iron	1.05 (10.5)	1.25 (12.5)	1.25 (12.5)	1.25 (12.5)
D.i. with steel covers, steel	1.6 (16)	1.6 (16)		
AISI-316	1.6 (16)	1.6 (16)		
Available flanges				
DIN PN (bar)	10, 16 ; optional with groove acc. DIN 2512N			
ANSI (lbs)	150 RF			
JIS (K)	5, 10			
Liquid temperature range				
Standard	-15° to 120°C (5 to 248°F)			
Weight (kg) - Add weight of counter from page 3.				
Ductile iron	230	460	1020	1100
	320	500	1100	1300

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.

Notes:

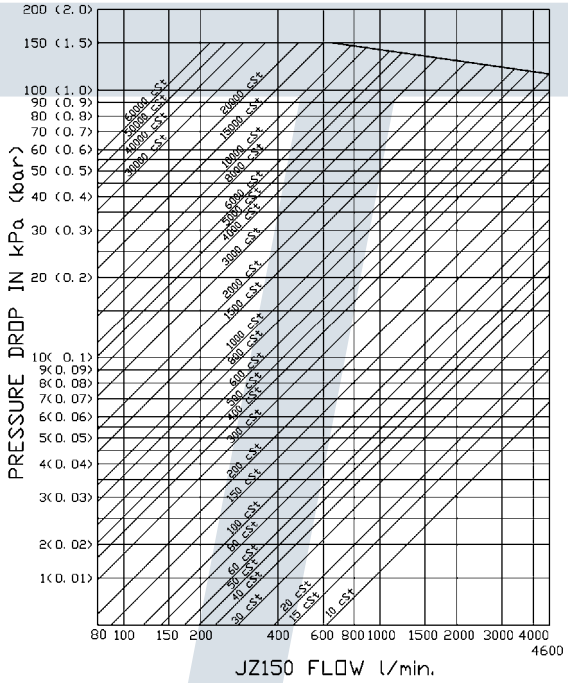
1) Model No. J5300 can also be supplied with DN 300 and 400 (14" and 16") flanges. Consult the factory on application.

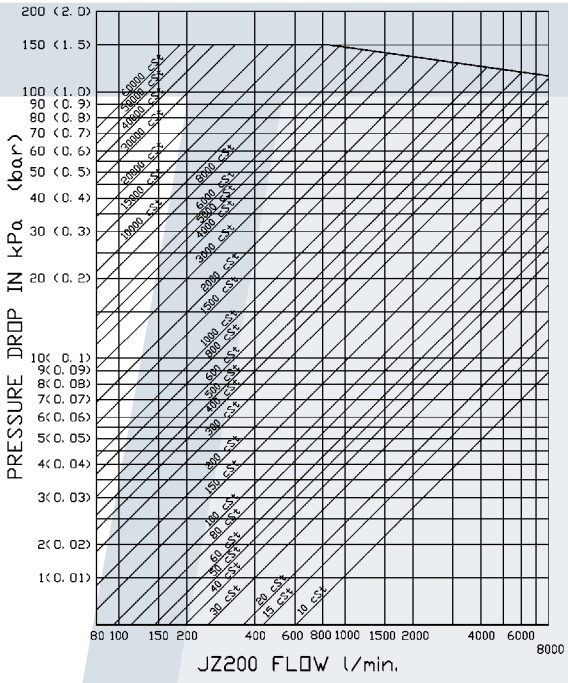
2) The specified capacities only refer to Newtonian liquids. For liquids with viscosities over 1,000 mPa.s the maximum flowrate is limited because of the maximum allowable pressure drop across the flowmeter. For liquids with viscosities below 0.5 mPa.s and/or with poor lubricating properties it is also advisable to reduce the maximum flow, or to use the flowmeter not continuously, as in batching applications, to prevent excessive wear of the vanes. A general rule is to reduce the maximum capacity to 75% of the value specified in above table.

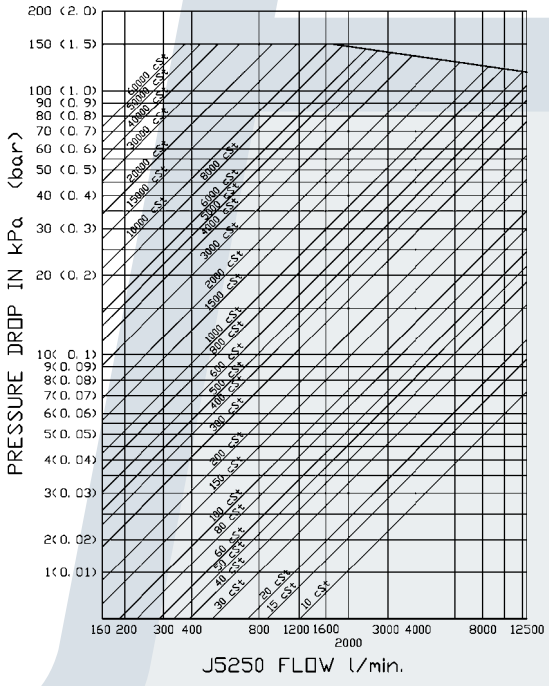
Lower minimum capacities are possible dependent on liquid viscosity and required measuring accuracy. Consult VAF Instruments on application.

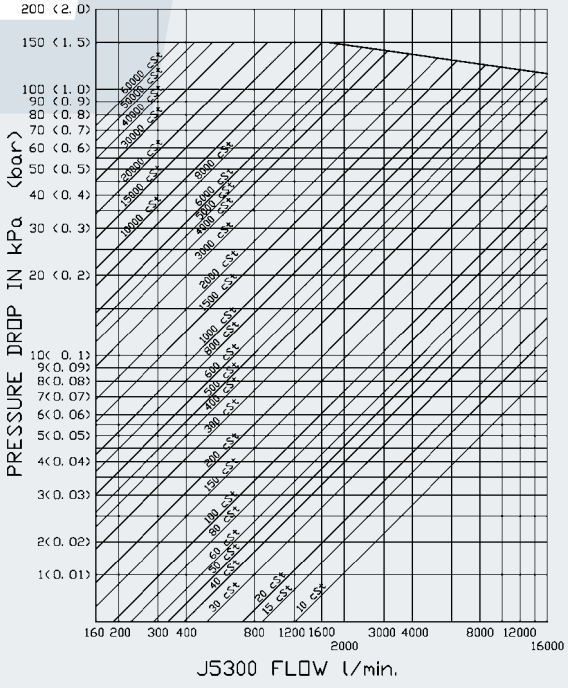
3) Standard factory calibration.

4) Calibration on request.









Electronic signal processing instrumentation

VAF offers a complete range of microprocessor controlled, analogue and digital instruments for indicating, totalising, registering and controlling liquid flows. Electronic instruments are available as modular plug-in units or in housings for wall or flush panel mounting. Output options for a number of instruments provide interfaces to chart recorders, printers, alarms and distributed control networks. VAF's system engineers will be pleased to assist you in working out customized flow control systems in accordance with your requirements. At the present time our basic series of electronic flow signal processing instrumentation comprises:

- Flow computers
- Multifunction flow controllers
- Flow totalisers with optional temperature compensation
- Batch counters
- Batch controllers
- Ratio controllers
- Pulse amplifiers/pulse discriminators
- Power supplies
- Scalers
- Frequency-to-current converters

Options and accessories

- Internal flushing bores. Prevent deposits when crystallising liquids must be measured.
- Stainless steel encapsuled magnet coupling between meter body and counter adapter. Prevents corrosion by aggressive process liquids.
- Special adaptations for accurate measurement of liquids with very high or very low viscosities, e.g. molasses or LPG.
- Helium leak-test when volatile liquids must be measured.
- Custody transfer accuracy certification for models up to JZ150. Consult factory for calibration certificates of bigger flowmeters.
- Liquid filters and deaerators.
- Counter extension and/or swivel adapter between counter and meter body for easier reading on loading platforms etc. Maximum extension length 3 metres.
- Automatic temperature compensation.

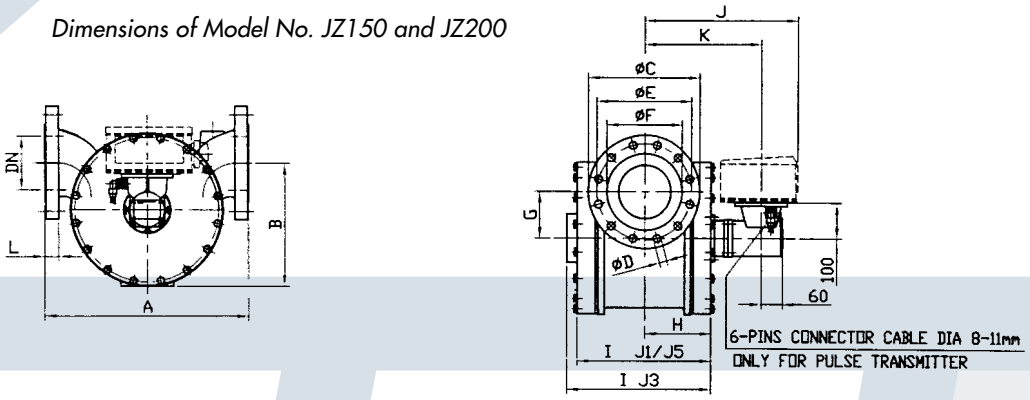
Liquid filter/Airvent.

Appropriate liquid filtering is essential for protection of the flowmeter.

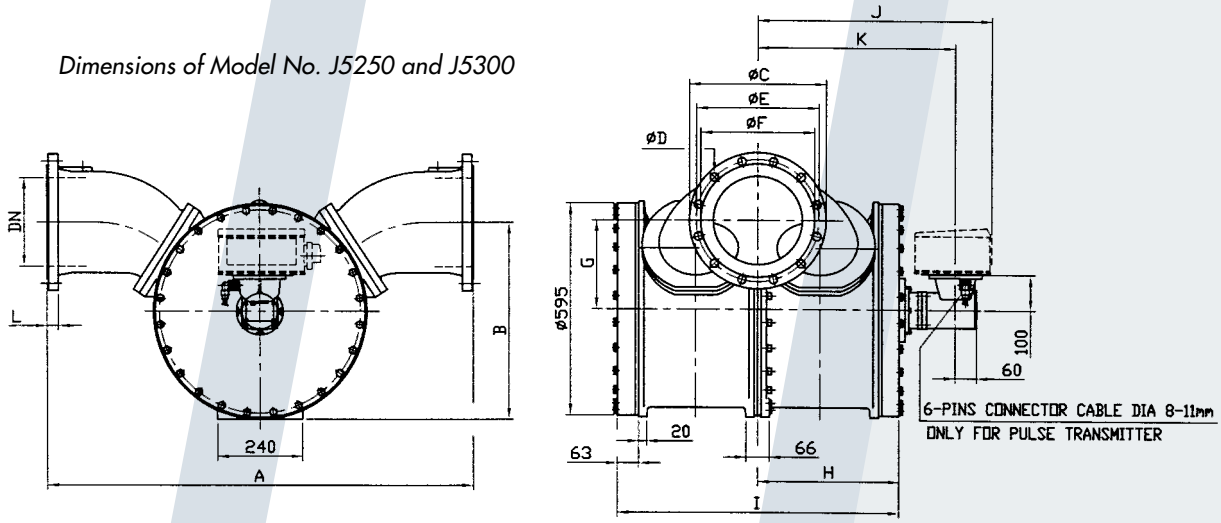
Dimensions

Flange dimensions apply to flowmeters with DIN PN 10 flanges. Build-in dimensions of flowmeters with other pressure ratings are available on application. For counter dimensions refer to the relevant product bulletins. Except where noted all dimensions are in millimeters.

Dimensions of Model No. JZ150 and JZ200



Dimensions of Model No. J5250 and J5300



DUCTILE IRON FLOWMETERS

Connection size	A	B	C	bolt holes D	bolt holes qty	E	F	G	H	I	J	K	L (min)	M
DN 150 (6″)	550	345	283	23	8	241	212	130	180	360	395	321	26	3
DN 200 (8″)	900	528	343	22	8	295	268	225	225	450	440	366	29	3
DN 250 (10″)	1200	553	395	22	12	350	320	250	400	800	633	559	31	3
DN 300 (12″)	1200	578	445	22	12	400	370	275	400	800	633	559	33	4

STEEL FLOWMETERS

Connection size	A	B	C	bolt holes D	bolt holes qty	E	F	G	H	I	J	K	L (min)	M
DN 150 (6″)	550	345	283	23	8	241	215	130	190	380	405	331	28	3
DN 200 (8″)	900	528	343	22	8	295	268	225	235	470	450	376	29	3

STAINLESS STEEL FLOWMETERS

Connection size	A	B	C	bolt holes D	bolt holes qty	E	F	G	H	I	J	K	L (min)	M
DN 150 (6″)	550	345	283	23	8	241	215	130	202	430	443	386	28	3
DN 200 (8″)	900	528	343	22	8	295	268	225	255	540	500	426	29	3

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Quotation and ordering information

For proper selection of the suitable HiFlow® 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 4): _____

7. Diameter liquid piping: _____

8. Wetted parts material: ❑ ductile iron ❑ carbon steel ❑ AISI-316

9. Connection flanges: ❑ DIN PN .....bar ❑ ANSI RF.....lbs ❑ JIS.....K

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

11. Local counter:
❑ no built-on counter (continue with step 12)
❑ resetable flowmeter register
❑ mechanical batch counter:
knock-off: ❑ electrical ❑ pneumatic ❑ mechanical
❑ one stage knock-off ❑ two stage knock-off
❑ ticket printer (on resetable flowmeter register or mechanical batch counter)
❑ flowrate indicator
❑ FlowCount rate-totaliser

12. Pulse transmitter:
❑ number of low speed inductive pulse transmitter(s): _____ ; prefered pulses/litre: _____
❑ number of high speed inductive pulse transmitter(s): _____ ; prefered pulses/litre: _____
❑ pulse discriminator, (din rail mounting) using 2 inductive pulse transmitters
❑ incremental pulse encoder ; prefered pulses/litre: _____
❑ reed switch fitted to resetable register

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
❑ delivery acc. NACE specification MR0175
❑ other: _____

15. Tagging: ❑ paper tag ❑ stn. stl. tag fixed to flowmeter

16. Other options and accessories (see page 3): _____

17. Name: _____ Place and date: _____

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