

VAF

INSTRUMENTS



LoFlow[®]

Series J Vane Meters DN 10-25 (3/8"-1")

150

Product Bulletin

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TO BE
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SURE

Introduction

VAF Instruments' LoFlow[®] positive displacement type liquid flowmeters are used in continuous metering applications, in-line blending processes and batch applications. LoFlow[®] 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. LoFlow[®] 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 (better than 0.3% 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 70 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 m³/hr). LoFlow[®] flowmeters cover the lower part of the range.

Available LoFlow[®] meters

LoFlow[®] meters are available in connection sizes from 10 mm up to 25 mm representing maximum flow ranges from 20 l/min up to 50 l/min. A choice of material is available with steel and stainless steel. For registration of the measured amount of liquid VAF LoFlow[®] meters can be fitted with various combinations of counters and pulse transmitters.

Liquids

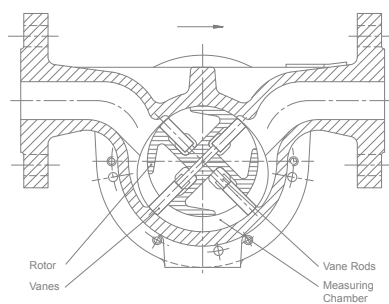
VAF Instruments positive displacement flowmeters series LoFlow[®] are suitable for a wide range of liquids. Because liquids with higher viscosities do not degrade the accuracy of the sliding vane flowmeter, it is possible to use only one flowmeter for various liquids. LoFlow[®] meters are used for acids, alkalines, cleansing liquids, solvents, water, edible oils and fats, liquor, glucose, paint, all petrochemical liquids alcohol, printing ink, glue and many other organic and inorganic liquids.

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. LoFlow[®] is a registered trade mark of VAF Instruments B.V.

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.



Sectional view of LoFlow[®] meter

Features & benefits

Features	Benefits
High capacity and rangeability	One meter for a wide range of flows
	Lower investment
High accuracy	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 required before or behind meter thus less space required
Compact design	Easy to integrate in compact systems
	Space saving
Certified by European Classification Authorities (MID - approval) for custody transfer applications	Calibration according standard procedures
	Time saving
Constructed to CE standards	No special adjustments necessary
From ISO 9001 registered company	Assured product quality
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 with standard counters and Ex pulse transmitters	Standard flowmeter suitable for hazardous areas



Technical specification

Basic model number	JX010 ¹	JX015 ¹	J3023
Connection size	DN 10 mm (3/8")	DN 15 mm (1/2")	DN 25 mm (1")
Flow range [litres/min] ²	1 - 20	2,5 - 50	2,5 - 50
Accuracy ³	± 0,3 %		
Repeatability	± 0,05 %		
Volume per revolution [ml]	10	25	25
Materials of construction			
body	steel / AISI 316		AISI 316
bearings	steel / AISI 316		AISI 316
o-rings	viton / PFA		
Connections			
thread	3/8" BSP	1/2" BSP	N / A
pipe couplings	12 mm	16 or 18 mm	N / A
Flanges			
DIN (RF, or with groove acc. DIN 2512N)	DN 10/15/25, PN 10/16/25/40 bar	DN 15, PN 10/16/25/40 bar	DN 25, PN 10/16/25/40 bar
ANSI B16.5 RF	1/2", 3/4", 1" class 150 & 300	1/2" class 150 & 300	1", class 150 & 300
JIS	DN 15, DN 25, 10/16/20K	DN 15, 5/10/16/20K	DN 25, 5/10/16/20K
Body pressure rating [bar]	52		
Ambient temperature⁴	-35°C to 70°C		
Liquid temperature⁴	standard -15°C to 125°C; high temperature version: with totaliser max. 180°C, with non-indicating pulse transmitter max. 200°C		
Built-on counter			
totaliser	6 digit non-resetable totaliser Ex II G Ex ia IIC T6...T3 (depending on medium temperature)		
flowcount rate totaliser	LCD counter, 7 digit resetable total, 4 digit flowrate indication Ex II 2 G EX ia IIB T3		
Counter reading units			
totaliser [litres]	0,01	0,1	0,1
flowcount rate totaliser	as required by customer		
Flow direction	left to right, right to left, top to bottom or bottom to top		
Inductive pulse transmitter			
max. number per flowmeter	2		
protection class	DIN 19234 (NAMUR) PTB No. 99 ATEX 2219X and GENELEC Ex ia IIC T6...T4		
pulse rates	see table		
Incremental pulse encoder	includes pulse discriminator (not available with mechanical totaliser)		
pulse rate	see table		
maximum frequency [kHz]	5		
supply voltage [VDC]	12-35		
Approximate weight [kg]	3,5	5	7

Notes: ¹ X= variable: if X = 1, body material is carbon steel, if X = 3, body material is AISI 316 stainless steel.

² Specified maximum flowrates are for discontinuous use and apply to viscosities between 0.5 and 5 mPa.s. For continuous operation capacities should be limited to 75% of maximum discontinuous flow. For other viscosities the flow range can be determined by using the pressure drop graphs on page 5.

³ The specified accuracy applies to a flow range of 1:20 and a liquid viscosity range of 0.5 to 5 mPa.s. Within a narrower measuring range the accuracy will be better.

Consult factory on application.

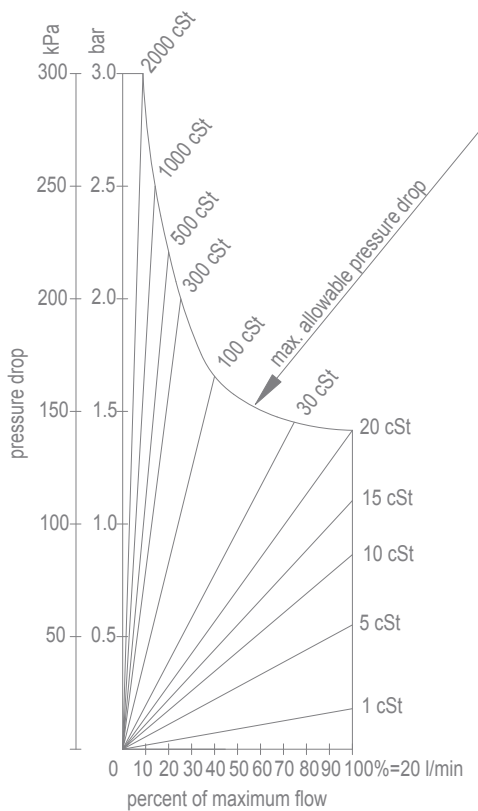
⁴ Depending on execution.

Flow ranges

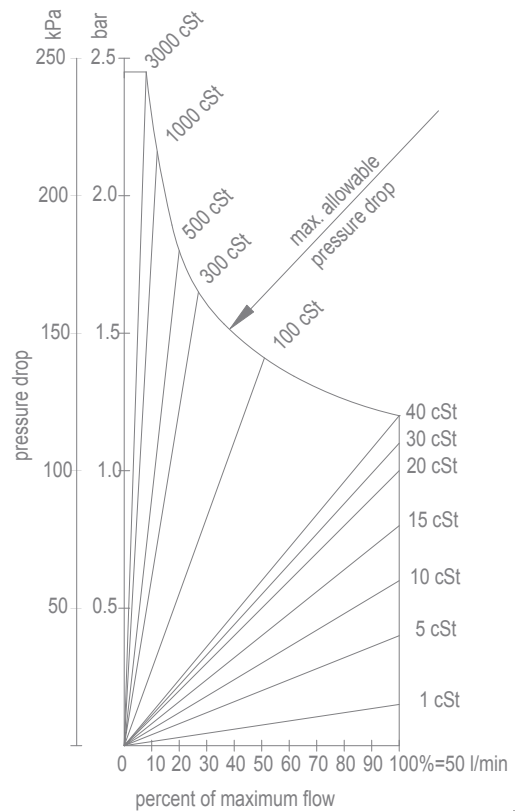
To select the appropriate meter size for your process the graphs on this page must be used. The data in these graphs only refer to standard flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3000 mPa.s. Lower minimum capacities are possible dependent on liquid viscosity 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 JX010



Meter size JX015/023

Note: 1 cSt = 1 mPa.s if specific gravity is 1.0

Technical specification

Pulse transmitters

LoFlow 'J' meters, except models equipped with a FlowCount rate-totaliser, can be provided with one or more pulse transmitters. Two different types of transmitters are available:

A. Inductive pulse transmitter according NAMUR specification DIN 19234 for low frequency pulse generation. Transmitters have an IP55 enclosure and are intrinsically safe in accordance with DIN 19234(NAMUR) PTB No.99 ATEX 2219X and CENELEC Ex ia IIC T6...T4. This implies that the proximity switches may be used in electrical supply and control current circuits with [Ex ia] IIB or IIC. The flowmeter can contain one or two inductive pulse transmitters.

B. Incremental pulse encoder for high frequency pulse generation. For optimal accuracy the unit comprises of a double encoder together with a pulse

discriminator. When using an incremental encoder the flowmeter can not be equipped with a built-on counter.

For processing of the output pulse signals a full range of electronic instrumentation is available from VAF Instruments.

Further information on request.

Pulse discriminator

The pulse discriminator prevents measuring errors caused by pipeline vibrations and unsteady flow conditions. By using two pulse transmitters in the flowmeter, generating two identical pulse trains with a signal phase shift of 90 degrees, it is possible to eliminate these measuring errors. The pulse discriminator comprises of a printed circuit board installed in the pulse transmitter box. The discriminator is standard with incremental pulse encoders and is optional for use with inductive pulse transmitters.

Pulse rates - Inductive pulse transmitter

Meter model no.	Pulse indicator [pulses/liter]		
	Non-indicating incremental pulse transmitter		
	N = 100	N = 250	N = 500
JX010	10000	25000	50000
JX015 / J3023	4000	10000	20000

N = Number of pulses per revolution of the internal rotor/vanes assembly.

Pulse rates - Incremental pulse transmitter

Meter model no.	Pulse indicator [pulses/liter]													
	N = 1		N = 2		N = 5		N = 10		N = 20		N = 25		N = 50	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
JX010	10; 100	100	200	200	50; 500	500	1000	1000	2000	2000	2500	2500	-	5000
JX015 / J3023	0,1; 1; 40	40	80	80	0,5; 5; 50; 200	200	1; 10; 100; 400	400	800	800	1000	1000	-	2000

A = Flowmeters with totaliser, pulse generator(s) in the counter housing;

B = Flowmeters without totaliser, pulse generator(s) in a pulse box.

Options & accessories

Available models

- a. LoFlow® meter with mechanical totaliser and optional inductive pulse transmitter;
- b. LoFlow® meter with FlowCount Rate Totaliser;
- c. Non-indicating LoFlow® meter with pulse transmitterbox.

Transmitter variants

- Inductive pulse transmitter with optional pulse discriminator;
 - 1 or 2 passive proximity switches acc. NAMUR DIN 19234;
 - Protection class IP55;
 - Intrinsically safe acc. PTB No. 99 ATEX 2219X and Cenelec Ex ia/ib IIC T6, if used with a suitable safety barrier;
- Incremental pulse encoder, comprising of a double pulse generator and a pulse discriminator. Open collector or active pulse output.

Pulse discriminator

The pulse discriminator prevents measuring errors caused by pipeline vibrations and unsteady flow conditions. By using two pulse transmitters in the flowmeter, generating two identical pulse trains with a signal phase shift of 90 degrees, it is possible to eliminate these measuring errors. The pulse discriminator comprises a printed circuit board installed in the pulse transmitter box. The discriminator is standard with incremental pulse encoders and is recommended for use with inductive pulse transmitters.

Built-on Totaliser, FlowCount Rate Totaliser or Pulse Transmitterbox

Series 'J' LoFlow® meter can be equipped with a built-on totaliser, a FlowCount rate totaliser or a pulse box. See tables for counter reading units and combinations of totaliser and pulse transmitter.

The LCD type rate totaliser is battery operated and has no need for external power supply. The instrument is mounted onto the flowmeter and is housed in a dustproof and watertight enclosure according IP67 and NEMA4X standards. The FlowCount is fully programmable with user configurable K-factor, reading units, decimal point position, filter constant and timebase. Flowrate and totals can be displayed in millilitres, litres, gallons or cubic metres, per second, minute, hour or day.

Options include a two-wire 4-20 mA output. When this option is installed, all operating power for the rate totaliser is drawn from the 4-20 mA loop, thereby extending battery life. A second option combines a DC power input with high and low flow alarms. The milliampere option and the flow alarm option can not be combined in one instrument.

A pulse transmitter box is a non-indicating box which is built directly onto the flowmeter, and holds the inductive transmitter(s) according to Namur with optional pulse discriminator, or the incremental pulse encoder that includes a discriminator.



Totaliser



FlowCount

Applications

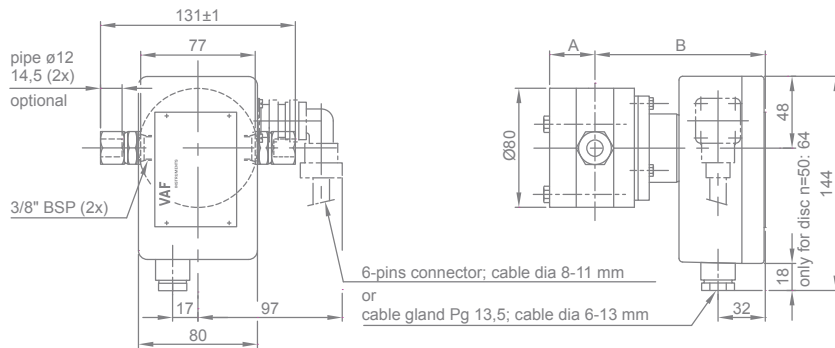
All types of batching and inline blending operations, such as:

- Dosing and continuous blending of additives to fuel and lubricating oils;
- Injection of vegetable oils and fats to food and animal feed processes;
- Measuring paint streams in automatic spray cabins;
- Measuring raw materials in perfume production;
- Injection of catalysts in chemical reactors;
- Dosing or flavouring and aromatic additives in the food industry;
- Glue and pigment addition in the packing industry.

Dimensions

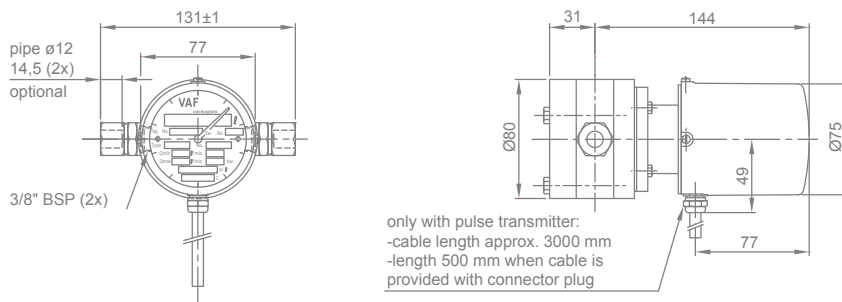
Except where noted all dimensions are in millimetres.

Dimensions of other versions not shown here are available on request.

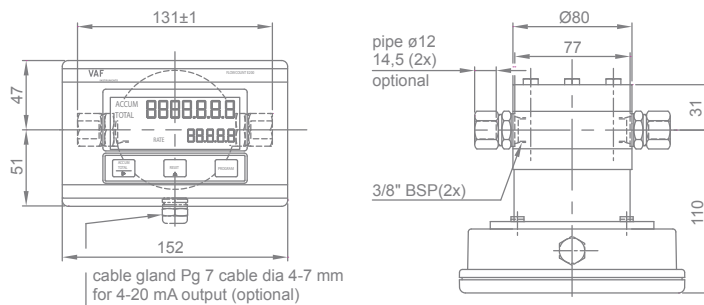


A. Meter size DN 10 ($3/8$ "), with non-indicating pulse transmitter and threaded or pipe connections.

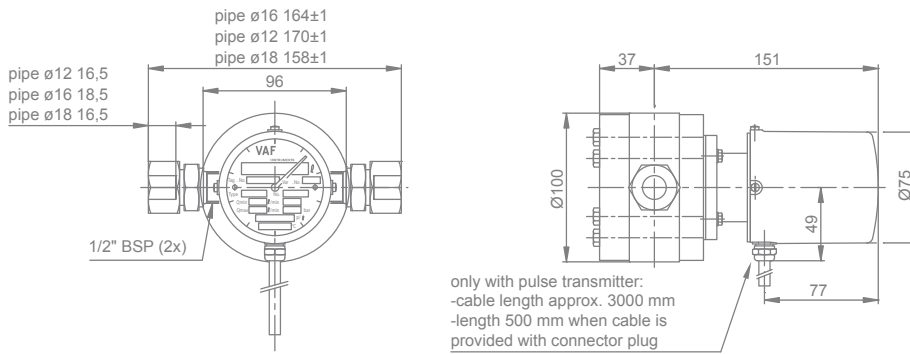
Meter model no.	Pulse transmitter	A	B	Cable connector
J1010 / J3010	inductive	31	115	Pg 13,5 or 6 pin
J1010 / J3010	incremental	31	121	Pg 13,5 or 6 pin



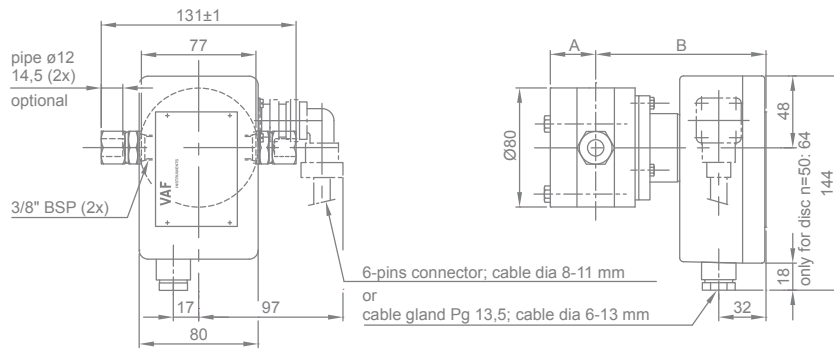
B. Meter size DN 10 ($3/8$ "), with totaliser and threaded or pipe connections.



C. Meter size DN 10 ($3/8$ "), with flowcount totaliser and threaded or pipe connections.

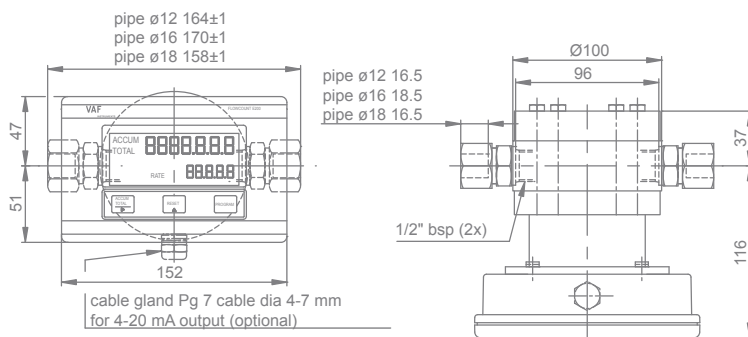


D. Meter size DN 15 (1/2"), with totaliser and threaded or pipe connections.



E. Meter size DN 15 (1/2"), with non-indicating pulse transmitter and threaded or pipe connections.

Meter model no.	Pulse transmitter	A	B	Opt. cable connector	Cable connector
J1015 /	inductive	37	121	12, 16 or 18	Pg 13,5 or 6 pin
J3015	incremental	37	127	12, 16 or 18	Pg 13,5 or 6 pin

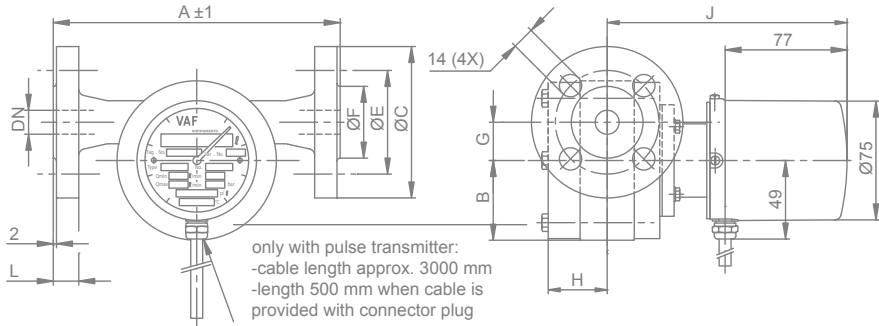


F. Meter size DN 15 (1/2"), with flowcount rate totaliser and threaded or pipe connections.

Dimensions

Except where noted all dimensions are in millimetres.

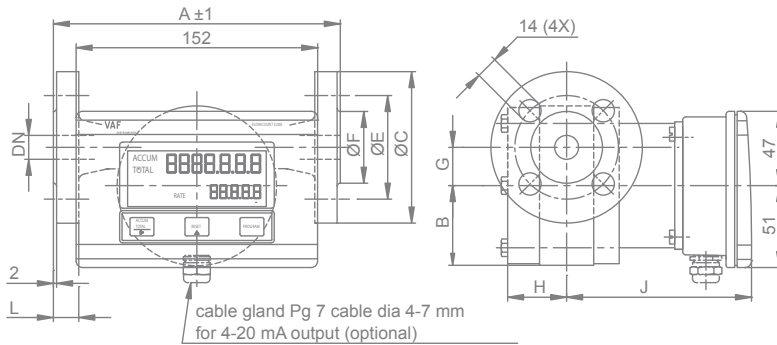
Dimensions of other versions not shown here are available on request.



Flanged models PN 40 and PN 52 with totaliser and optional inductive pulse transmitter.

G. Meter sizes DN 10 ($\frac{3}{8}$ "), 15 ($\frac{1}{2}$ ") and 25 (1"), with totaliser and DIN flange connections.

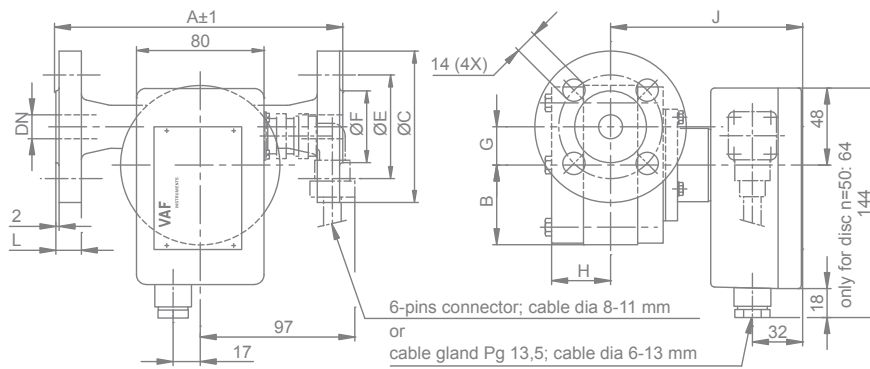
Meter model no.	Connection size	A	B	Ø C	Ø E	Ø F	G	H	J	L
J1010 / J3010	DN 10	180	40	90	60	40	0	31	143	16
J1010 / J3010	DN 15	180	40	95	65	45	0	31	143	16
J1010 / J3010	DN 25	180	40	115	85	68	0	31	143	18
J1015 / J3015	DN 15	180	50	95	65	45	24	37	150	16
J3023	DN 25	220	50	115	85	68	24	37	150	18



Flanged models PN 40 and PN 52 with flowcount rate totaliser.

H. Meter sizes DN 10 ($\frac{3}{8}$ "), 15 ($\frac{1}{2}$ ") and 25 (1"), with flowcount rate totaliser and DIN flange connections.

Meter model no.	Connection size	A	B	Ø C	Ø E	Ø F	G	H	J	L
J1010 / J3010	DN 10	180	40	90	60	40	0	31	110	16
J1010 / J3010	DN 15	180	40	95	65	45	0	31	110	16
J1010 / J3010	DN 25	180	40	115	85	68	0	31	110	18
J1015 / J3015	DN 15	180	50	95	65	45	24	37	116	16
J3023	DN 25	220	50	115	85	68	24	37	116	18



Flanged models PN 40 and PN 52 with non-indicating pulse transmitter.

I. Meter sizes DN 10 ($\frac{3}{8}$ "), 15 ($\frac{1}{2}$ ") and 25 (1"), with non-indicating pulse transmitter and DIN flange connections.

Meter model no.	Connection size	Pulse transmitter	A	B	ø C	ø E	ø F	Cable connector	G	H	J	L
J1010 / J3010	DN 10	inductive	180	40	90	60	40	Pg 13,5 or 6 pin	0	31	115	16
		incremental	180	40	90	60	40	Pg 13,5 or 6 pin	0	31	121	16
J1010 / J3010	DN 15	inductive	180	40	95	65	45	Pg 13,5 or 6 pin	0	31	115	16
		incremental	180	40	95	65	45	Pg 13,5 or 6 pin	0	31	121	16
J1010 / J3010	DN 25	inductive	180	40	115	85	68	Pg 13,5 or 6 pin	0	31	115	18
		incremental	180	40	115	85	68	Pg 13,5 or 6 pin	0	31	121	18
J1015 / J3015	DN 15	inductive	180	50	95	65	45	Pg 13,5 or 6 pin	24	37	121	16
		incremental	180	50	95	65	45	Pg 13,5 or 6 pin	24	37	127	16
J3023	DN 25	inductive	220	50	115	85	68	Pg 13,5 or 6 pin	24	37	121	18
		incremental	220	50	115	85	68	Pg 13,5 or 6 pin	24	37	127	18

Quotation & ordering information

For proper selection of the suitable LoFlow® meter the following data should be determined:

Liquid data:

1. **Process liquid** (trade name or chemical composition):
2. **Flowrate** [l/min] minimum: normal: maximum:
3. **Operating pressure range** [bar]: allowable pressure drop [bar]:
4. **Operating temperature range** [°C]: process liquid ambient:
5. **Specific gravity at operating conditions** [kg/l]: viscosity [mPas]:

Flowmeter data:

6. **Basic model number:**
 7. **Diameter liquid piping** [mm]:
 8. **Wetted parts material:** carbon steel ANSI 316
 9. **Connection flanges:** DIN PN [bar]: ANSI [lbs]: JIS [K]:
 thread pipe couplings
 10. **Direction of flow:** left to right right to left top to bottom bottom to top
 11. **Local counter:** non-resettable totaliser (N-counter) flowcount rate-totaliser
 12. **Pulse transmitter:** no. of inductive pulse transmitter(s): preferred pulses/litre:
 pulse discriminator
 incremental pulse encoder preferred pulses/litre:
 13. **Options & accessories:** liquid filter
 electronic signal processing instrumentation* other*
 14. **Special certification:** inspection by customer standard factory calibration
 inspection by classification authority:
 factory test and material certificate acc. EN 10204 3.1
 MID
 other:
 15. **Tagging:** paper tag stn. stl. tag fixed to flowmeter
- * specify your requirements

Name: _____

Place and date: _____

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

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