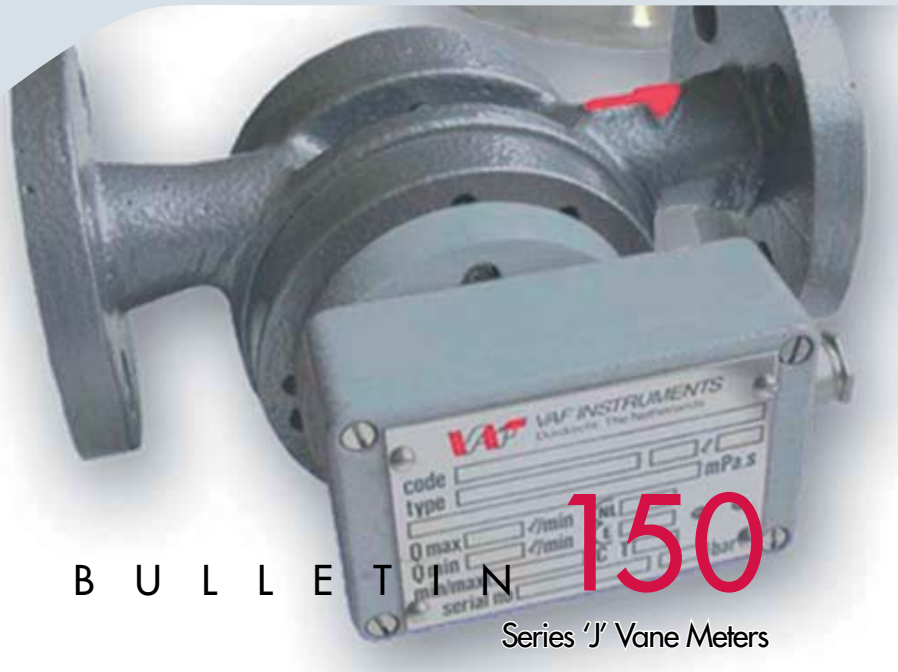
LoFlow®



PRODUCT BULLETIN 150

Series 'J' Vane Meters

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.

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 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). 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 ductile iron, 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 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.

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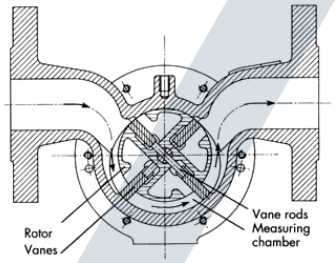
Principle of operation

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.

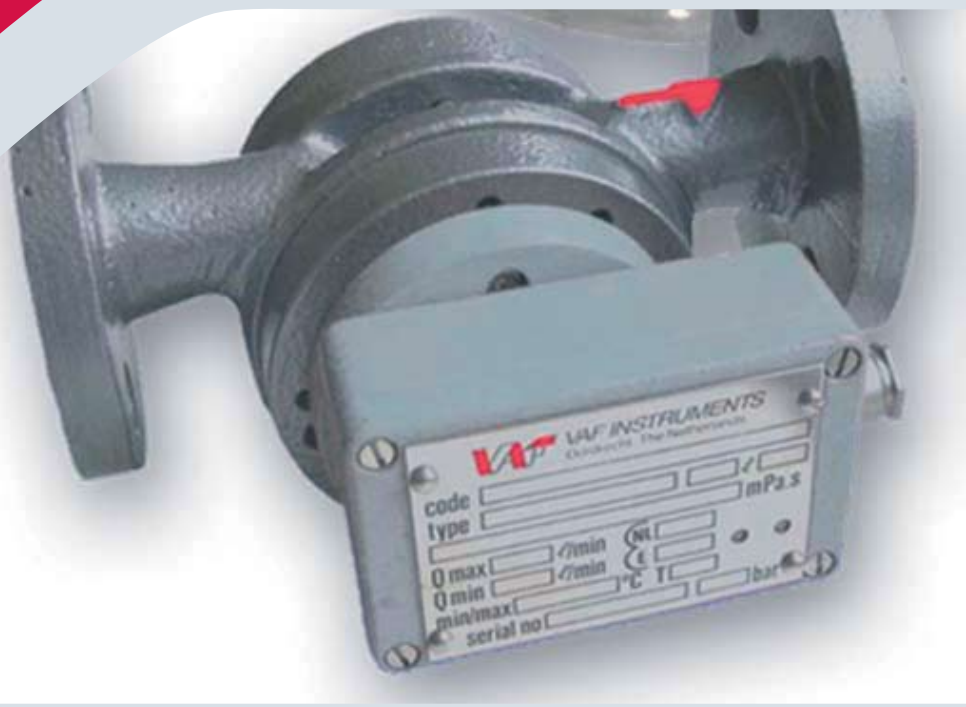


Sectional view of LoFlow® meter.

Features	Benefits
High capacity and rangebility	• 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 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 (MID - 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 3.1 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.



Built-on Totaliser, FlowCount Rate Totaliser & Pulse Box

Series 'J' LoFlowmeters 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 K-factor, reading unit, decimal point position, filter constant and timebase which are user configurable. 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.

Technical specifications

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 llitres/min [2])	1 - 20	2.5 - 50	2.5 - 50
Accuracy [3])	+/- 0.3%		
Reproducibility	+/- 0.05%		
Volume per revolution	10 ml	25 ml	25 ml
Materials of construction Body Bearings O-rings	 steel/AISI 316 steel/AISI 316 Viton or Viton/PFA	 steel/AISI 316 steel/AISI 316 Viton or Viton/PFA	 AISI 316 AISI 316 Viton or Viton/PFA
Connections Thread Pipecouplings	 3/8″ BSP 12 mm	 1/2″ BSP 16 or 18 mm	 N/A N/A
Flanges DIN (RF, or with groove acc. DIN 2512N) ANSI B16.5 RF JIS	 DN 10/15/25, PN 10/16/25/40 bar 1/2″, 3/4″, 1″ class 150 & 300 DN 15, DN 25, 10/16/20K	 DN 15, PN 10/16/25/40 bar 1/2″ class 150 & 300 DN 15, 5/10/16/20K	 DN 25, PN 10/16/25/40 bar 1″, class 150 & 300 DN 25, 5/10/16/20K
Body pressure rating	52 bar		
Ambient temperature [4]) Liquid temperature [4])	-35°C to 70°C 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 1) Totaliser 2) FlowCount rate totaliser	 6-digit non-resetable totaliser Ex II 2 G EEx ia IIC T6…T3 (depending on medium temperature) LCD counter, 7-digit resetable total, 4-digit flowrate indication Ex II 2 G EEX ia IIB T3		
Counter reading units Totaliser (litres) FlowCount rate totaliser	0.01 as required by customer	0.1	0.1
Flow direction	as required: left-to-right, right-to-left, top-to-bottom, bottom-to-top		
Inductive pulse transmitter Max. qty. per flowmeter Protection class Pulse rates	 2 DIN 19234(NAMUR) PTB No.99 ATEX 2219X and CENELEC EEx-ia IIC T6…T4 see table on page 6		
Incremental pulse encoder Pulse rate Maximum frequency Supply voltage	includes pulse discriminator. (not available with mechanical totaliser) see table on page 6 5 kHz 12-35 VDC		
Approximate weight	3.5 kg	5 kg	7 kg

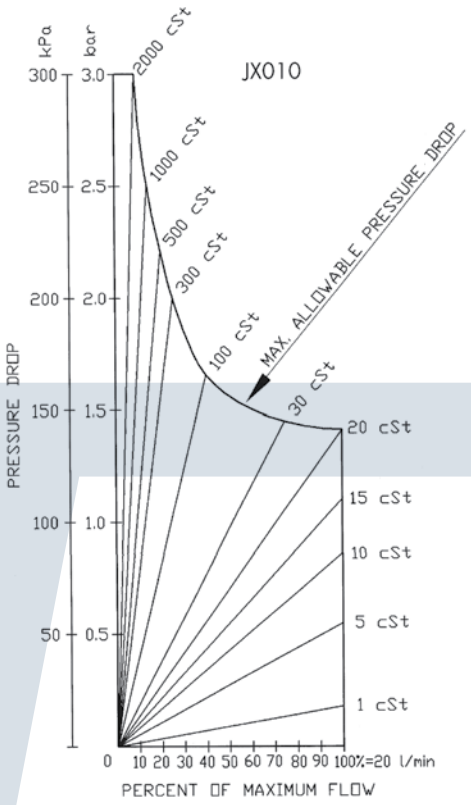
Notes: [1]) **X= variable: if X = 1, body material is carbon steel, if X = 3, body material is AISI 316 stainless steel**
[2]) **Specified maximum flowrates are for discontinuous use and apply to viscosities between 0.5 and 5 mPa.s. For continuous operation capacities should be limited to 75% of maximum 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

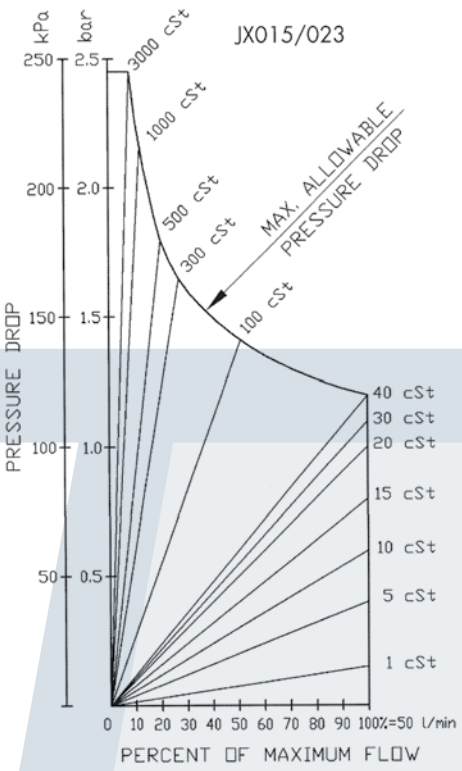
To select the appropriate meter size for your process the graphs on this page must be used.The data in these graphs only refer to standard flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities over 3,000 mPa.s. Lower minimum capacities are possible dependent on liquid viscosity 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 JX010



Meter size JX015/023

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

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.
- Measuring amniotic fluid in hospitals.
- Dosing or flavouring and aromatic additives in the food industry
- Glue and pigment addition in the packing industry.

Options and accessories

- Material certificate acc. EN 10204 3.1
- Delivery according NACE specification MR-0175
- Custody transfer accuracy certification (MID).
- Special adaptations for accurate measurement of liquids with very high viscosity.
- Helium leak-test when volatile liquids must be measured.
- Liquid filters and deaerators.

Optional liquid filter.

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 EEx-ia IIC T6…T4. This implies that the proximity switches may be used in electrical supply and control current circuits with [EEx 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.

Totaliser/pulse transmitfter combinations
A = available,
N/A = not available
X = available in all listed body materials

Meter model No.	JX010	JX015	JX023
Totaliser or rate totaliser	A	A	A
Totaliser + pulse transmitter,			
-inductive	A	A	A
-incremental	N/A	N/A	N/A
Non-indicating pulse transmitter			
-inductive	A	A	A
-incremental	A	A	A

Pulse rates

Inductive pulse transmitter

Meter	Pulse rate (pulses/litre)													
Model	N = 1		N = 2		N = 5		N = 10		N = 20		N = 25		N = 50	
No.	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
JX15/023	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.
N = Number of pulses per revolution of the internal rotor/vanes assembly.
X = Available in all listed body materials

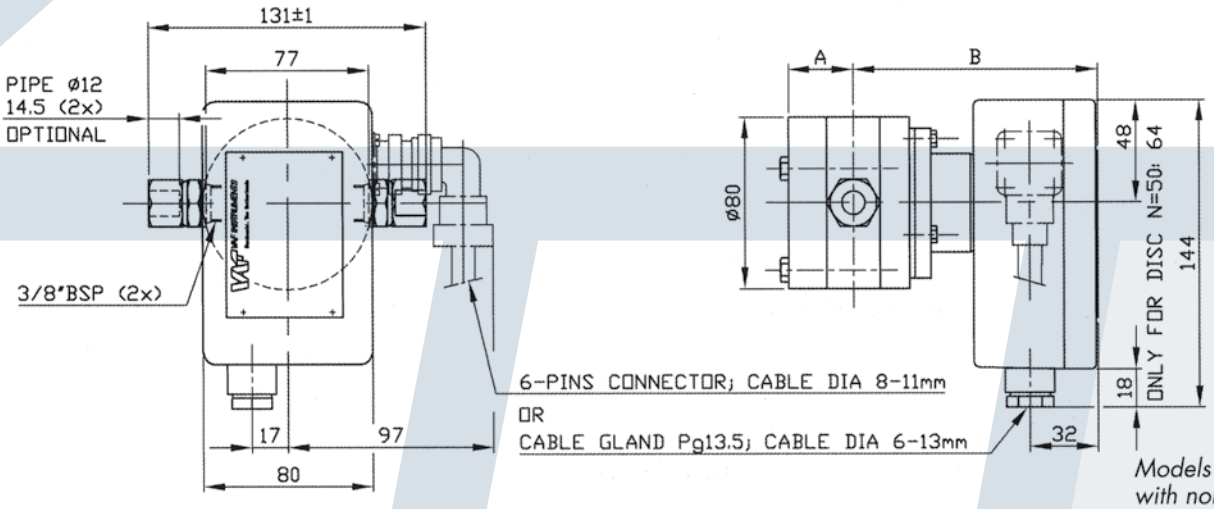
Incremental pulse transmitter

Meter	Pulse rate (pulses/litre)		
Model	Non-indicating incremental pulse transmitter		
No.	N = 100	N = 250	N = 500
JX010	10,000	25,000	50,000
JX15/023	4,000	10,000	20,000

Dimensions

Except where noted all dimensions are in millimetres. Dimensions of meter versions not shown here are available on application

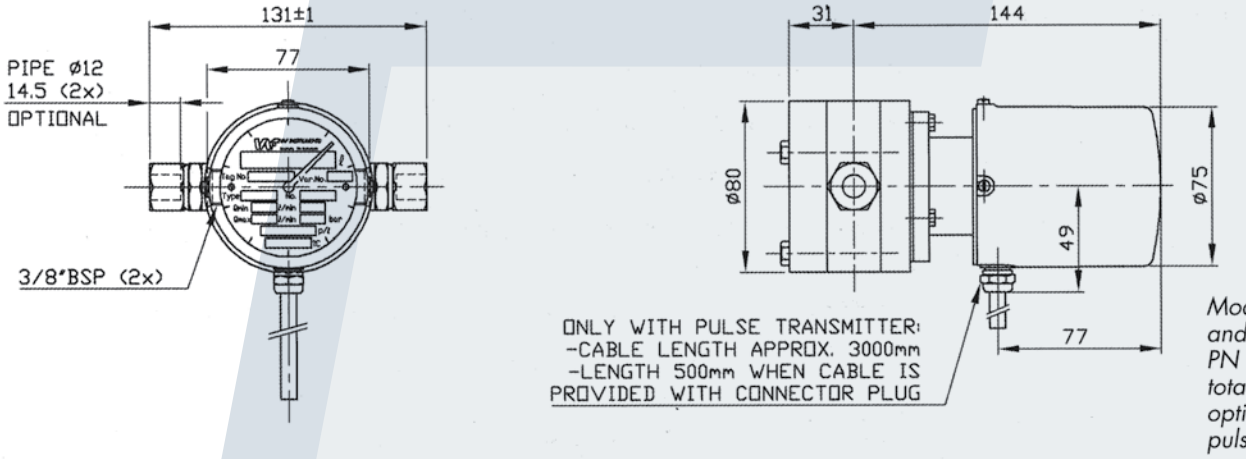
A. METER SIZE DN 10 (3/8"), WITH NON-INDICATING PULSE TRANSMITTER AND THREADED OR PIPE CONNECTIONS.



Models J1010 and J3010 with non-indicating pulse transmitter

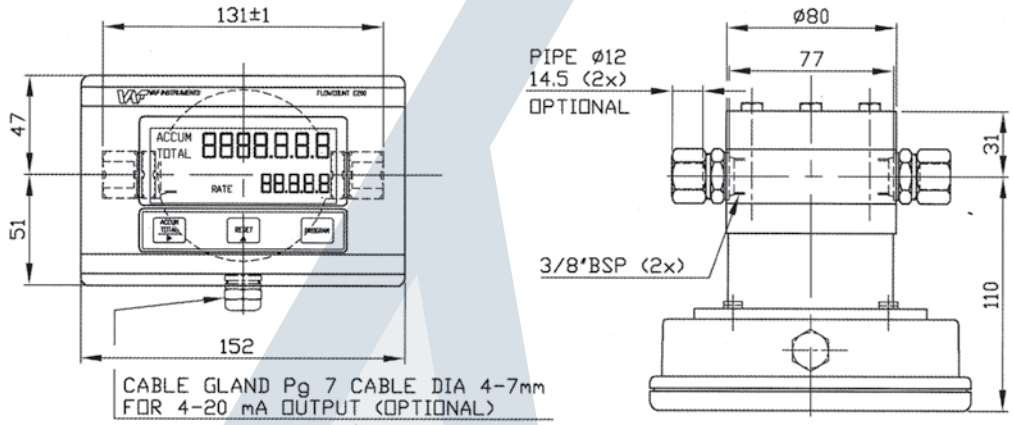
Meter Model No.	Type of pulse transmitter	A	B	Cable connector
J1010/J3010	Inductive	31	115	Pg 13.5 or 6-pin
J1010/J3010	Incremental	31	121	Pg 13.5 or 6-pin

B. METER SIZE DN 10 (3/8"), WITH TOTALISER AND THREADED OR PIPE CONNECTIONS.



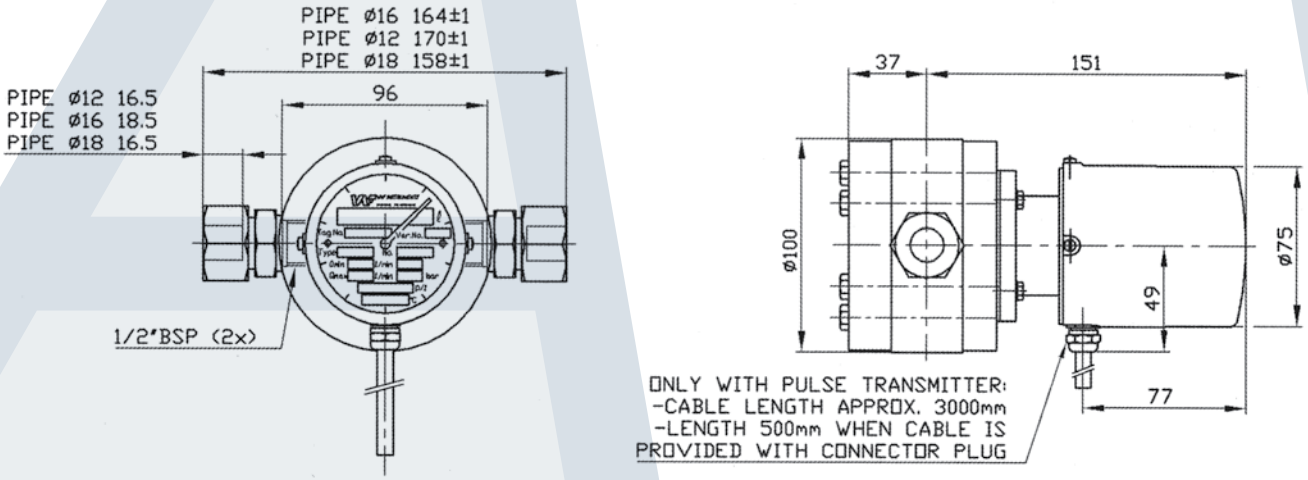
Models J1010 and J3010, PN 52 bar, with totaliser and optional inductive pulse transmitter

C. METER SIZE DN 10 (3/8"), WITH FLOWCOUNT RATE TOTALISER AND THREADED OR PIPE CONNECTIONS.



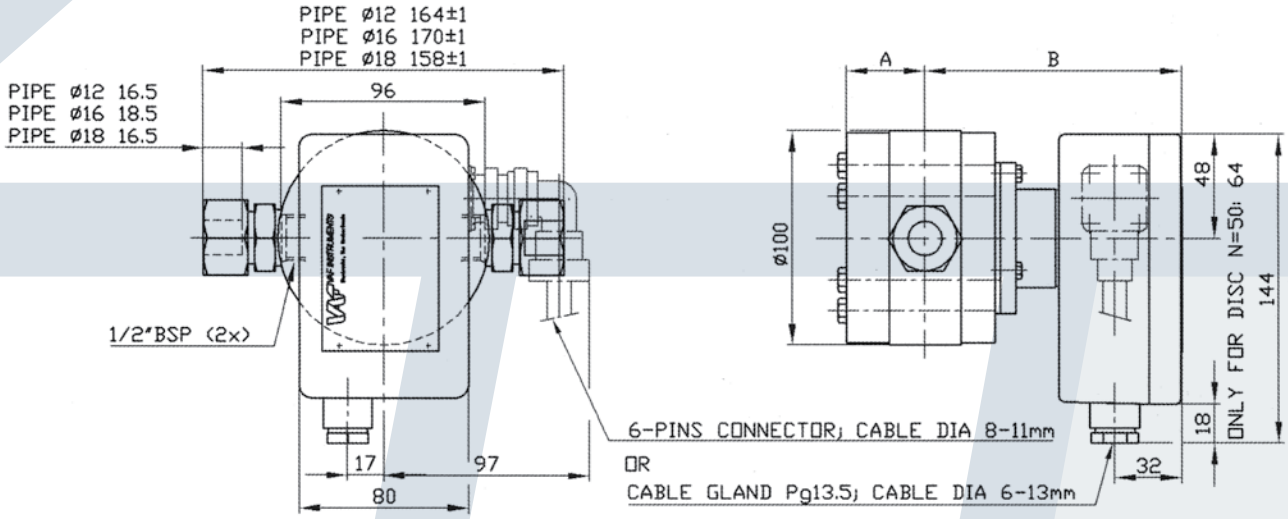
Models J1010 and J3010 with FlowCount rate totaliser

D. METER SIZE DN 15 (1/2"), WITH TOTALISER AND THREADED OR PIPE CONNECTIONS.



Models J1015 and J3015, PN 52 bar, with totaliser and optional inductive pulse transmitter

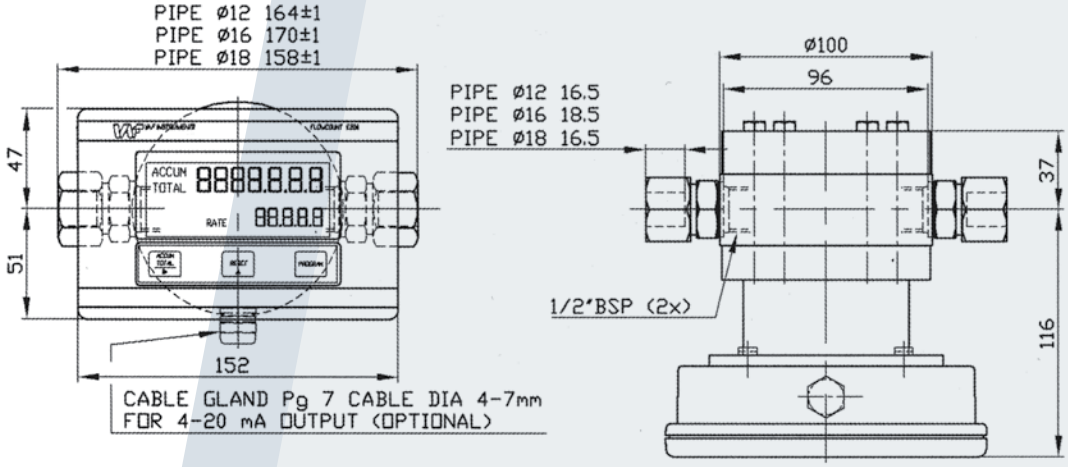
E. METER SIZE DN 15 (1/2"), WITH NON-INDICATING PULSE TRANSMITTER AND THREADED OR PIPE CONNECTIONS.



Models J1015 and J3015 with non-indicating pulse transmitter

Meter Model No.	Type of pulse transmitter	A	B	Optional pipe conn.	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

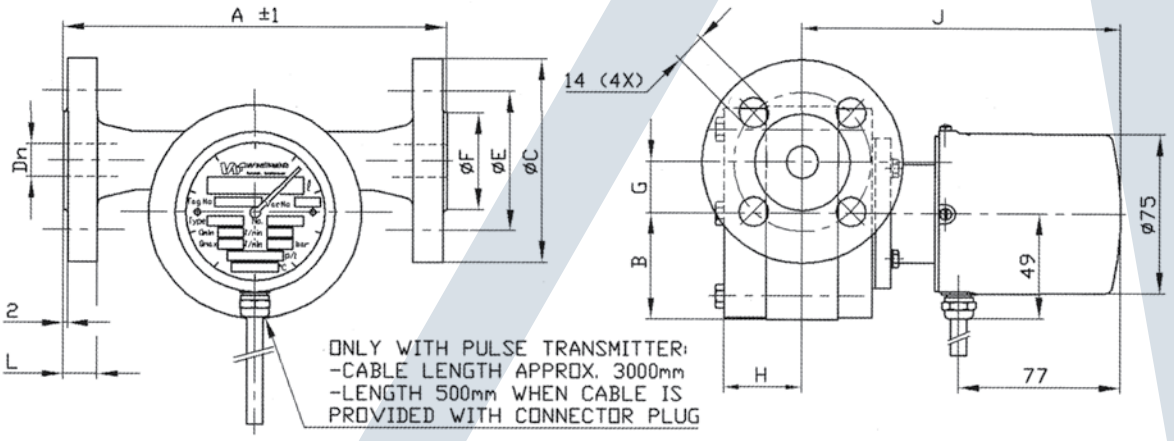
F. METER SIZE DN 15 (1/2"), WITH FLOWCOUNT RATE-TOTALISER AND THREADED OR PIPE CONNECTIONS.



Models J1015 and J3015 with FlowCount rate totaliser

G. METER SIZES DN 10 (3/8"), 15 (1/2") AND 25 (1"), WITH TOTALISER AND DIN FLANGE CONNECTIONS

Flange ratings DIN PN 10/16/25/40 bar
Dimensions of other flange types available on application.

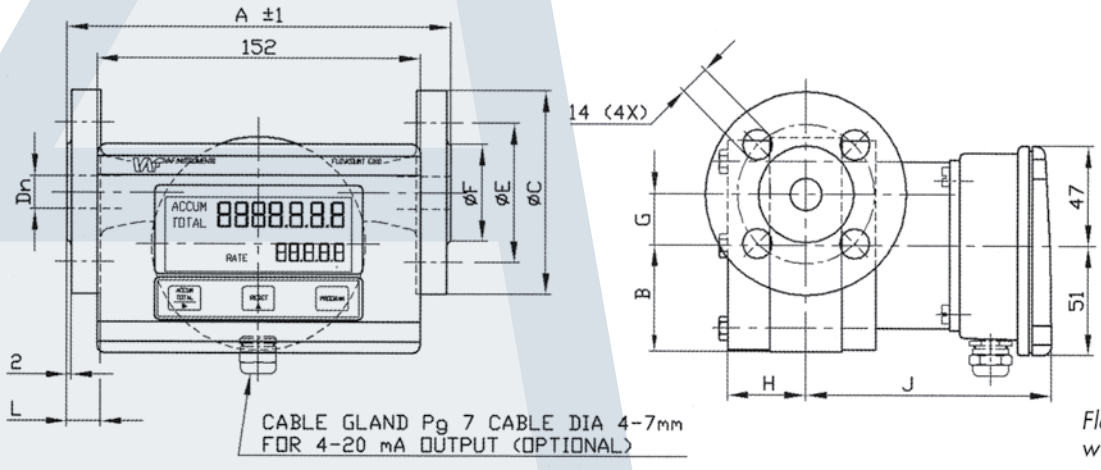


Flanged models PN 40 & 52 with totaliser and optional inductive pulse transmitter

Meter Model No.	Conn. size	A	B	øC	øE	øF	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

H. METER SIZES DN 10 (3/8"), 15 (1/2") AND 25 (1"), WITH FLOWCOUNT RATE TOTALISER AND DIN FLANGE CONNECTIONS

Flange ratings DIN PN 10/16/25/40 bar
Dimensions of other flange types available on application.

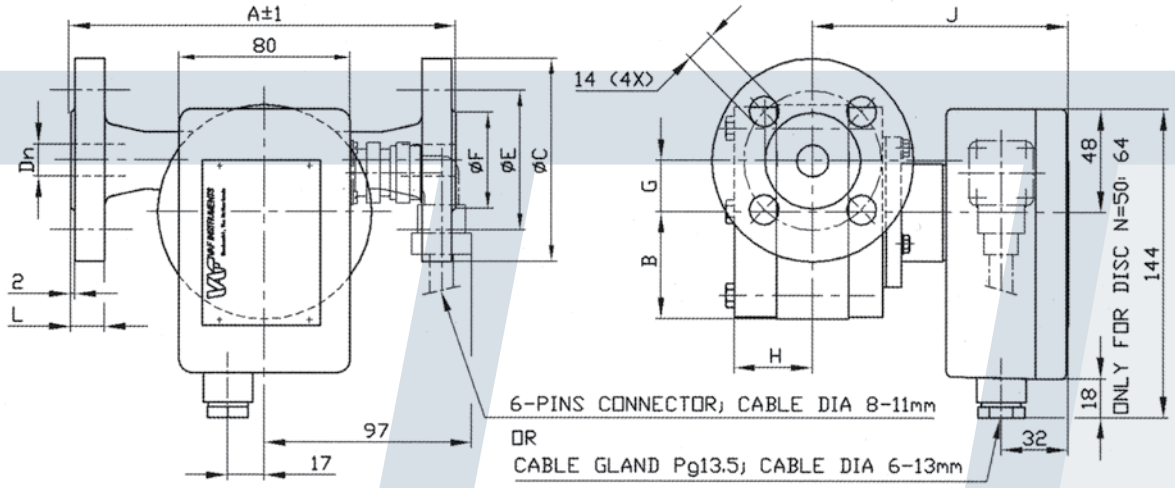


Flanged models PN 40 & 52 with FlowCount rate totaliser

Meter Model No.	Conn. size	A	B	øC	øE	øF	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

I. METER SIZE DN 10 (3/8"), 15 (1/2") AND 25 (1"), WITH NON INDICATING PULSE TRANSMITTER AND DIN FLANGE CONNECTIONS

Flange ratings DIN PN 10/16/25/40 bar
Dimensions of other flange types available on application.



Flanged models PN 40 & 52 with non-indicating pulse transmitter

Meter Model No.	Conn. size	Type of pulse transmitter	A	B	øC	øE	øF	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

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. Flow rate (l/h): min. _____ 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:

Check ❑ as required.

6. Basic model number (see page 4): _____
7. Diameter liquid piping: _____
8. Wetted parts material: ❑ carbon steel ❑ AISI 316
9. Connection flanges: ❑ DIN PN .....bar ❑ ANSI RF.....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-resetable totaliser (N-counter)
    ❑ 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
    ❑ incremental pulse encoder ; prefered pulses/litre: _____
13. Options & acc. ❑ liquid filter
    ❑ automatic temperature compensator
    ❑ electronical signal processing instrumentation *)
    ❑ other *)
14. Special certification: ❑ inspection by customer ❑ standard factory calibration
    ❑ inspection by classification authority: _____
    ❑ factory test and materials certificate acc. EN 10204 3.1
    ❑ MID
    ❑ delivery acc. NACE specification MR0175
    ❑ other: _____
15. Tagging ❑ paper tag ❑ stn. stl. tag fixed to flowmeter

*) Specify your requirements _____

16. Name: _____ Place and date: _____

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for quality and innovation

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DNV Certification B.V., The Netherlands
MGMT. SYS. RvA C 024

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Agents and distributors in more than 50 countries

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