

LoFlow®

Series 'J' Vane Meters

Introduction

Series 'J' LoFlow® positive displacement flowmeters provide extremely accurate volumetric measurement of a wide range of liquids, from low-density LPG to viscous chemical and petroleum products. The flowmeters are available for operating pressures to 320 bar and in a standard choice of high quality materials to cover almost any service condition.



Special versions

This brochure comprises only our standard delivery programme. Special flowmeter variants can be offered as tailor-made solutions. Consult VAF for further information.

Applications

All types of batching and in-line blending operations, such as:

- Dosing and continuous blending of additives to fuel and lubricating oils.
- High pressure injection moulding operations
- Metering hydraulic fluids in closed systems.
- 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 of flavouring and aromatic additives in the food industry.
- Glue and pigment addition in the packing industry.
- and many others.

Features

- Very high accuracy and reproducibility
- Designed to CE standards.
- ISO 9001 quality assurance.
- Material certificates acc. EN 10204-.2.2 or 10204-3.1B can be provided.
- Pressure ratings up to PN 320 bar.
- Wide viscosity range.
- Patented meter design.
- Easy to install, operate and maintain.
- Local and/or remote flow monitoring and control.

User benefits

- Blending and batching system accuracy. Saves on raw materials. Consistent end-product quality.
- Handles wide variety of liquids from low-density LPG to chemical and petroleum products with high viscosities.
- Extended metering range. Saves on initial purchasing cost and service parts inventory.
- Simplified construction with fewer moving parts. A warranty for a long and trouble-free service life.
- Simple and easy maintenance by the user. Saves on maintenance cost.
- A full line of flowmeters with display and signal processing instrumentation available from one supplier.

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

Liquids

VAF LoFlow meters are suitable for a wide range of liquids from low-density LPG to high-viscosity chemical and petroleum products, as long as the fluid can be pumped and is compatible with the materials of construction.

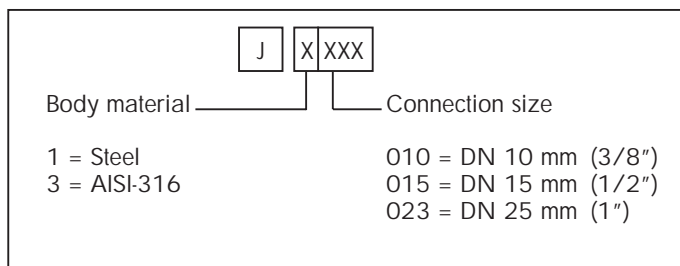
Liquid filter

The process liquid must be clean and free from air, gas or dirt. Solid particles may cause excessive wear. It is recommended to install a liquid filter with a mesh width of ≤ 0.05 mm (280 mesh) at the inlet of the flowmeter. If necessary also install a suitable deaerator. Refer to product bulletin No. 302 for more information.

Simple maintenance

Thank to its patented construction servicing of the LoFlow meter is particularly simple. The meter comprises only a limited number of parts which can easily be removed for inspection and servicing, thus ensuring a long meter life.

Basic model number



Available models

Nominal conn. size DN (inches)	Basic model No.	Body material	Body Pressure rating (PN)	Connections		
				Thread	Pipe couplings	Flanges DIN, ANSI, JIS *)
10 mm (3/8")	J1010	Carbon steel **)	52 bar	3/8" BSP	12 mm	DN 10 (3/8"), 15 (1/2"), 25 (1") Consult factory
	J1010	Carbon steel **)	300 bar	3/8" BSP	12 mm	
	J3010	AISI-316	52 bar	3/8" BSP	12 mm	
	J3010	AISI-316	300 bar	3/8" BSP	12 mm	
15 mm (1/2")	J1015	Carbon steel	52 bar	1/2" BSP	16 or 18 mm	DN 15 (1/2") N/A
	J1015	Carbon steel	320 bar	1/2" BSP	16 mm	
	J3015	AISI-316	52 bar	1/2" BSP	16 or 18 mm	
	J3015	AISI-316	320 bar	1/2" BSP	16 mm	
25 mm (1")	J3023	AISI-316	52 bar	N/A	N/A	DN 25 (1")

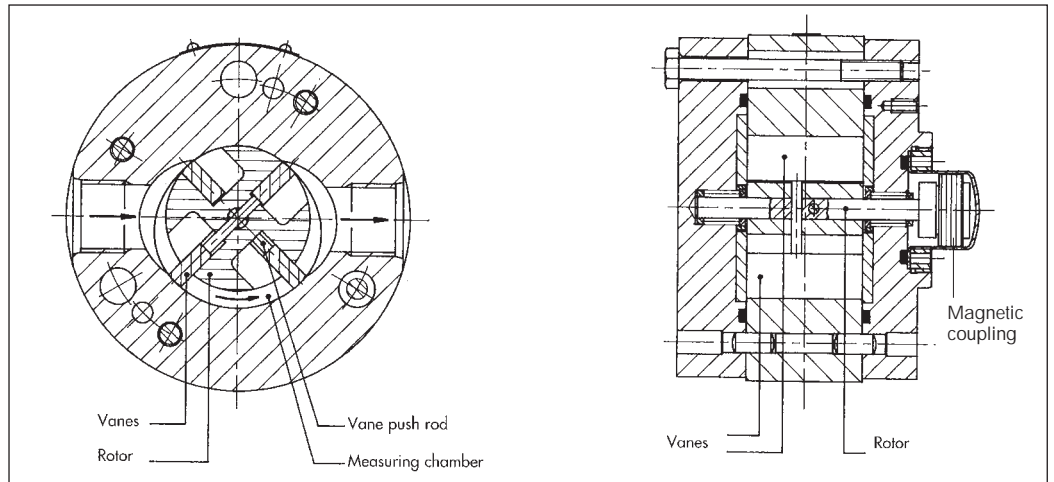
N/A = Not available

*) See Technical Specifications table for flange ratings.

**) Model No. J1010 with weld-on flanges has AISI-316 body and carbon steel covers.

Principle of operation

Series 'J' LoFlow meters 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 fitted into 4 slots in the rotor. Each pair is positioned by a rod and can move in and out of the rotor. The radial vane movement 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. A magnetic coupling transmits the rotor rotations from the measuring chamber to a built-on counter and/or a pulse transmitter for remote flow monitoring or control. The pulse transmitter can be connected to a wide range of VAF Instruments flow data processing instrumentation.



Sectional view of LoFlow Vane Meter

Built-on counters

Series 'J' LoFlow meters can be equipped with a built-on totaliser or a FlowCount rate-totaliser. See tables on page 5 for counter reading units and combinations of totaliser and pulse transmitter. Refer to Product Bulletin 250 for details of built-on counters.



Totaliser

FlowCount Rate Totaliser

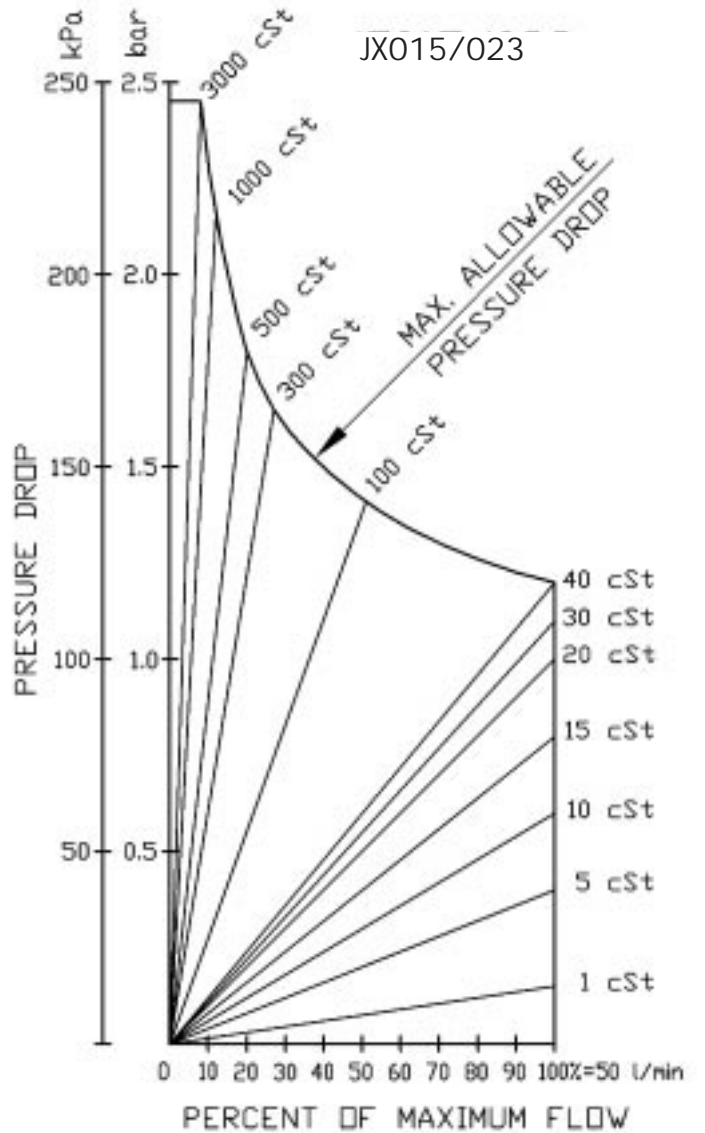
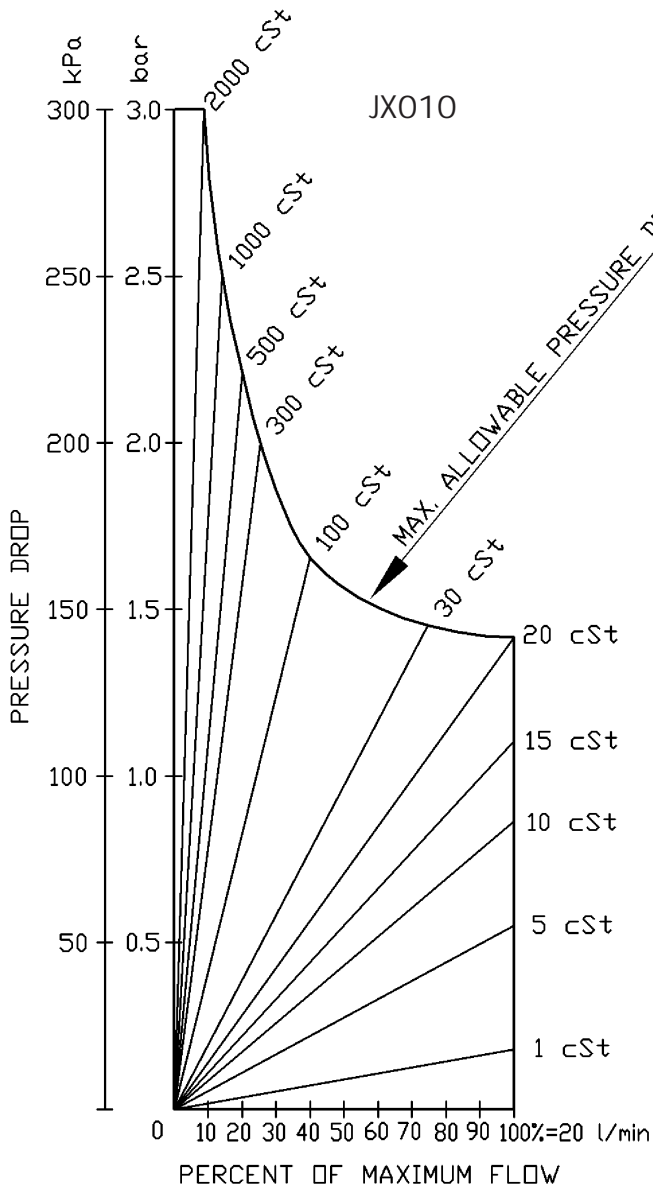
The LCD type rate-totaliser is battery operated and has no need for external power supply. The instrument is mounted to the flowmeter and is housed in a dustproof and watertight enclosure according to IP67 and NEMA4X standards. The FlowCount is fully programmable with the K-factor, reading unit, decimal point position, filter constant and timebase being 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. For more information refer to Product Bulletin 250.



FlowCount Rate Totaliser

Flowrate-pressure drop-viscosity relation



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

Pulse transmitters

LoFlow 'J' meters, except models equipped with a FlowCount rate-totaliser, can be provided with one or more pulse transmitters. Three 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 PTB No. Ex-83/2022X and Cenelec EEx ia/ib IIC T6. This implies that the proximity switches may be used in electrical supply and control current circuits with [EEx ia] IIB or IIC, respectively [EEx ib] IIB or IIC classifications. 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 a double encoder together with a pulse discriminator. When using an incremental encoder the flowmeter can not be equipped with a built-on counter.
- C. Magnetic pulse transmitter producing a non-calibrated pulse rate. Cenelec EEx ia IIB T5 approval for use in hazardous areas Zone 0, 1 or 2, Division 1 or 2, Class 1, Group C, provided that a suitable safety barrier is installed. When using a magnetic pulse transmitter 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 rates

Inductive pulse transmitter

Meter Model No.	Pulse rate (pulses/litre)													
	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	500	500	100;1000	1000	2000	2000	2500	2500	-	5000
JX015/023	1;40	40	80	80	200	200	10;400	400	800	800	1000	1000	-	2000

A = Flowmeters with totaliser, pulse generator(s) in the counter housing, calibrated pulses.

B = Flowmeters without totaliser, pulse generator(s) in a pulse box, non-calibrated pulses.

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

X = Available in all listed body materials

Incremental and magnetic pulse transmitter

Meter Model No.	Pulse rate (non-calibrated pulses/litre)			
	Non-indicating incremental pulse transmitter			Non-indicating magnetic pulse transmitter
	N = 100	N = 250	N = 500	
JX010	10,000	25,000	50,000	1,200 480
JX015/023	4,000	10,000	20,000	

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 counter housing or in the pulse transmitter box.

The discriminator is standard with incremental pulse encoders and is optional for use with inductive pulse transmitters. The discriminator is not available with magnetic pulse transmitters. For further details refer to product bulletin No 280.

Totaliser/pulse transmitter 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 -incremental -magnetic	A N/A N/A	A N/A N/A	A N/A N/A
Non-indicating pulse transmitter -inductive -incremental -magnetic	A A A	A A A	A A A

Technical specification

Basic Model Number	J1010/J3010	J1015/J3015	J3023
Connection size	DN 10 mm (3/8")	DN 15 mm (1/2")	DN 25 mm (1")
Flow range (litres/min) ¹⁾	1 - 20	2.5 - 50	2.5 - 50
Accuracy ²⁾	+/- 0.3%		
Reproducibility	+/- 0.05%		
Volume per revolution	10 ml	25 ml	25 ml
Materials of construction Body Bearings O-rings	steel, AISI-316. See 'Available Models', page 2 steel, AISI-316 Viton or Kalrez (all pressure ratings); Viton/PFA (max. PN 52 bar)		
Connections Screw thread Pipe couplings	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	see 'Available Models', page 2		
Ambient temperature Liquid temperature	-50 to 70°C standard -15 to 120°C; high-temperature version: with totaliser max. 180°C, with non-indicating pulse transmitter max. 200°C.		
Built-on counter Totaliser FlowCount rate totaliser	6-digit non-resettable totaliser LCD counter, 7-digit resettable total, 4-digit flowrate indication		
Counter reading units Totaliser (litres) FlowCount rate totaliser	0.01	0.1	0.1
	as required by customer		
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 NAMUR, DIN 19234, Cenelec EEx ia/b IIC T6, IP 55, PTB N° Ex-83/2022X see table on page 5		
Incremental pulse encoder Pulse rate Maximum frequency Supply voltage	includes pulse discriminator. Not available with mechanical totaliser see table on page 5 5 kHz 12-35 VDC		
Magnetic pulse transmitter Pulse rate Supply voltage Consumption Output Protection class	not available with mechanical totaliser see table on page 5 12-35 VDC 2VA at 35 VDC (no load) open collector or active pulses; U max. 25 VDC, I max. 100 mA Cenelec EEx ia IIB T5		
Approximate weight	3.5 kg	5 kg	7 kg

NOTES: 1) 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 using the pressure drop graphs on page 4.
2) 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.

Ordering information

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

Fluid data

1. Process liquid (trade name or chemical composition): _____
2. Flow rate (l/min): minimum _____ continuous _____ max. discontinuous _____
3. Operating pressure range (bar): _____
4. Allowable pressure drop (bar): _____
5. Operating temperature range (°C): _____
6. Specific gravity at operating conditions: _____
7. Viscosity at operation conditions: _____

Flowmeter data (check availability from the tables in this brochure):

Check as required.

8. Basic model number (see page 2): _____
9. Wetted parts material: AISI-316 carbon steel
10. Connections: screw thread pipe couplings
 DIN flanges ANSI flanges
 JIS flanges
11. Direction of flow: left to right; right to left;
 top to bottom; bottom to top
12. Built-on counter: FlowCount rate totaliser; reading unit:
 ml litres cu. metres US/Imp gallons
per: second minute hour day
FlowCount options:
 4-20 mA output, **or:** high & low flow alarm
 configuration for batching purposes
13. Pulse transmitter (see table on page 5):

- inductive pulse transmitter
No. of inductive pulse generators: _____; No. of pulses/litre: _____
- with pulse discriminator without pulse discriminator
- non-indicating incremental encoder, incl. pulse discriminator; _____
No. of pulses/litre: _____
- non-indicating magnetic pulse transmitter; _____; No. of pulses/litre: _____

Options and accessories

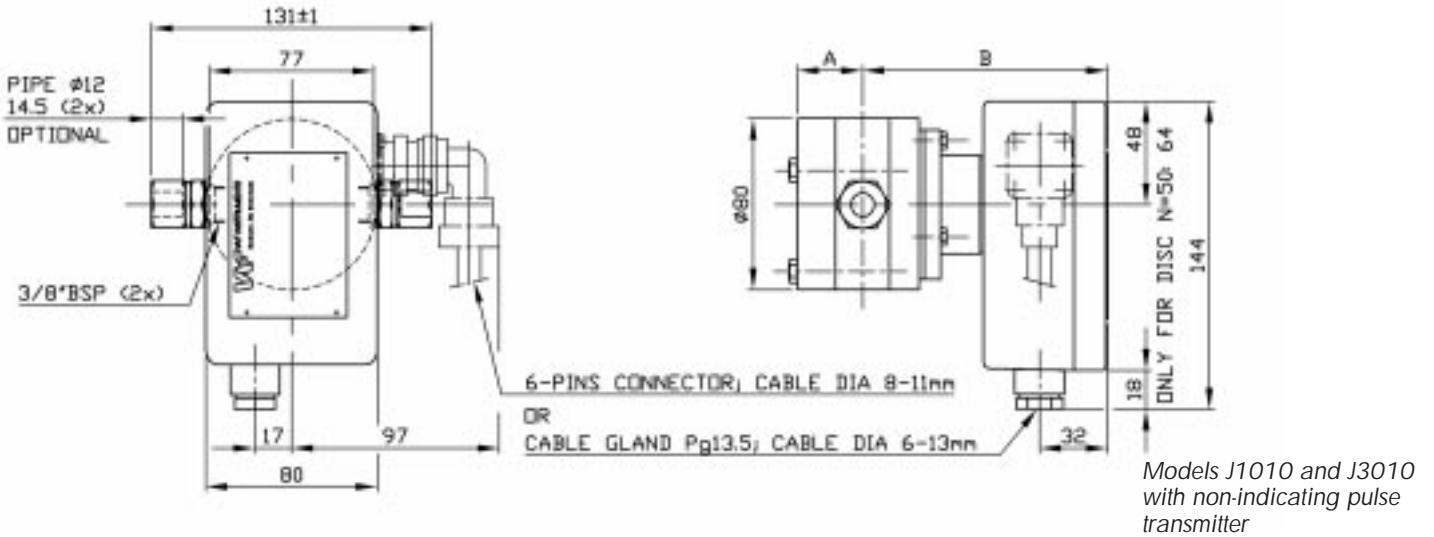
14. liquid filter
 automatic temperature compensation
 electronic signal processing instrumentation *)
 other *)
15. Special certification: material certificate acc. EN 10204-2.2; EN 10204-3.1B
 CE-certification acc. directive 89/392/EEC, Art. 4.2 and Annex II, sub B
 custody transfer calibration
 standard factory accuracy calibration
 other *)

*) Specify your requirements

Dimensions

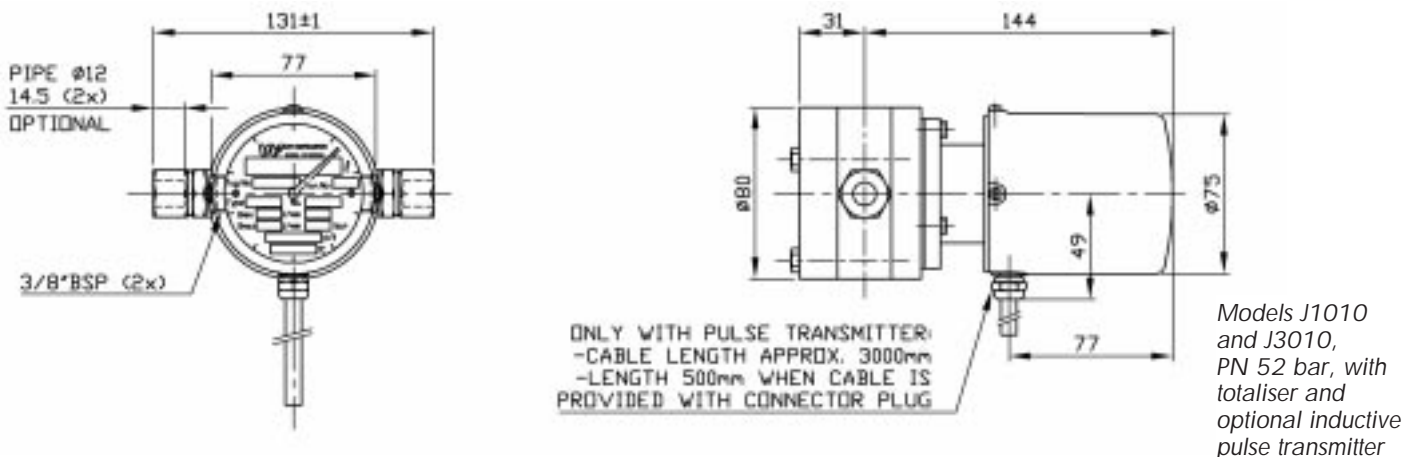
Except where noted all dimensions are in millimetres. Dimensions of meter versions not shown here are available on application.

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

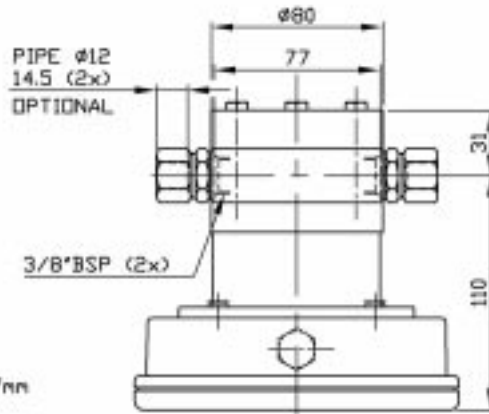
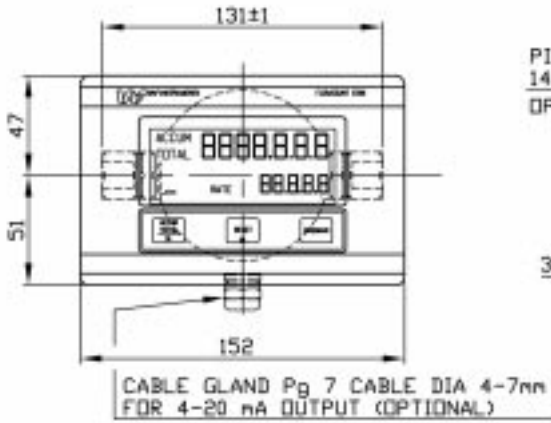


Meter Model No.	Type of pulse transmitter	A		B		Cable connector
		PN 52	PN 300	PN 52	PN 300	
J1010/J3010	Inductive	31	41	115	140	Pg 13.5 or 6-pin Pg 13.5 or 6-pin Pg 13.5
	Incremental	31	41	121	146	
	Magnetic	31	41	101	112	

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

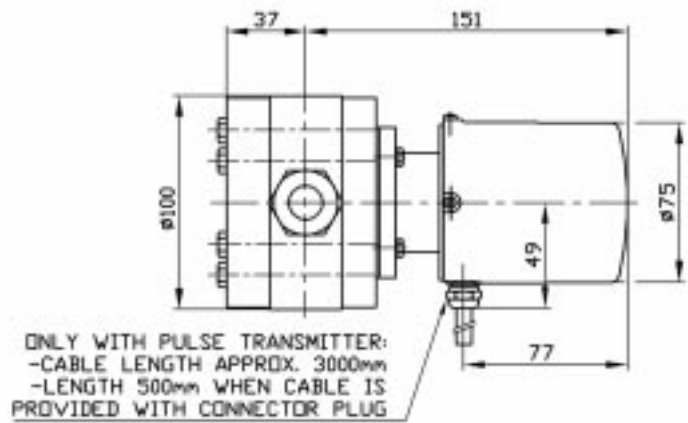
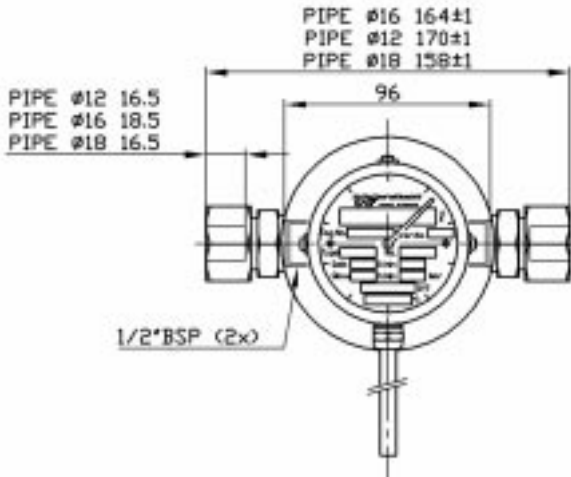


C. METER SIZE DN 10 (3/8"), WITH FLOWCOUNT RATE TOTALISER AND THREADED OR PIPE CONNECTIONS. ONLY PN 52.



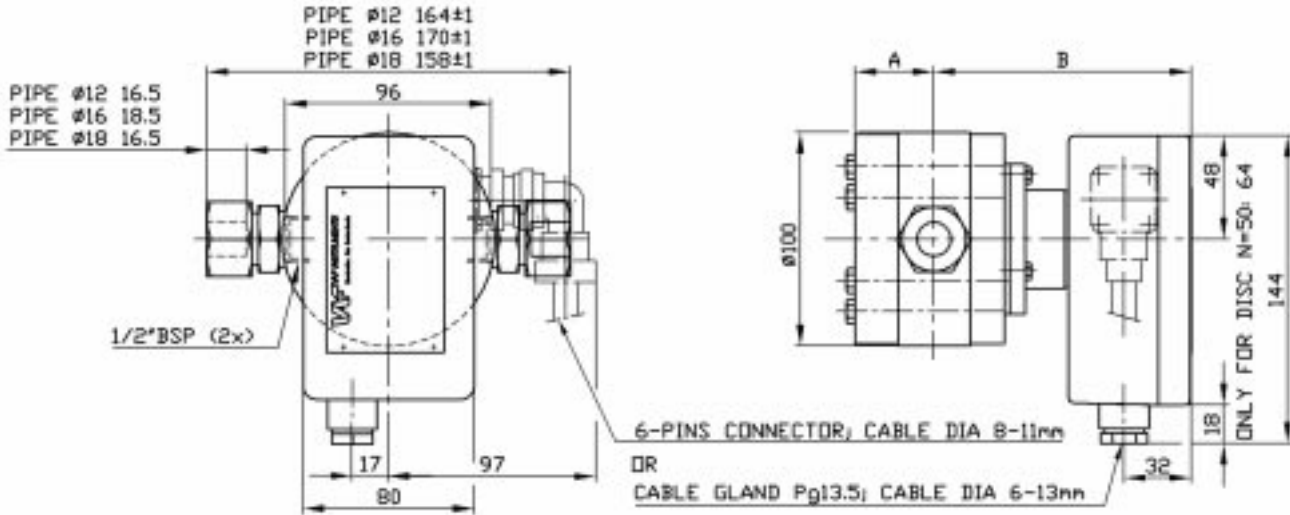
Models J1010 and J3010 with FlowCount rate totaliser

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

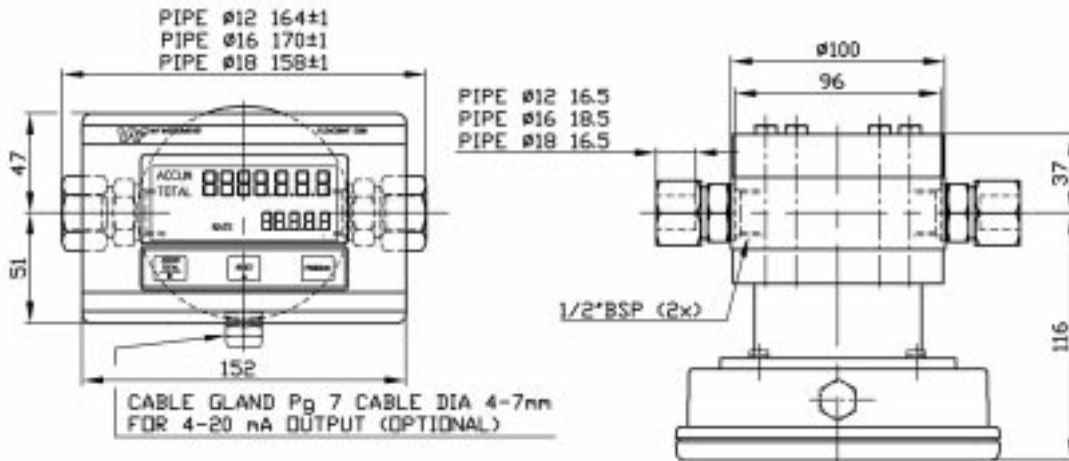
E. METER SIZE DN 15 (1/2"), WITH NON-INDICATING PULSE TRANSMITTER AND THREADED OR PIPE CONNECTIONS.



Models J1015 and J3015 with non-indicating pulse transmitter

Meter Model No.	Type of pulse transmitter	A		B		Optional pipe conn.		Cable connector
		PN 52	PN 320	PN 52	PN 320	PN 52	PN 320	
J1015/ J3015	Inductive	37	44	121	143	12, 16 or 18	12 or 16	Pg 13.5 or 6-pin Pg 13.5 or 6-pin Pg 13.5
	Incremental	37	44	127	149	12, 16 or 18	12 or 16	
	Magnetic	37	44	107	115	12, 16 or 18	12 or 16	

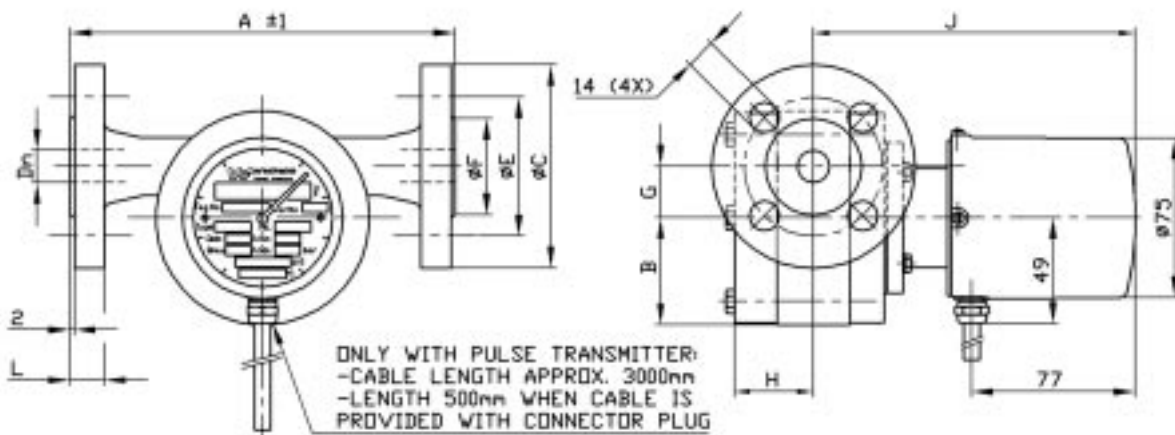
F. METER SIZE DN 15 (1/2"), WITH FLOWCOUNT RATE-TOTALISER AND THREADED OR PIPE CONNECTIONS. ONLY PN 52.



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
Build-in dimensions of other flange types available on application.

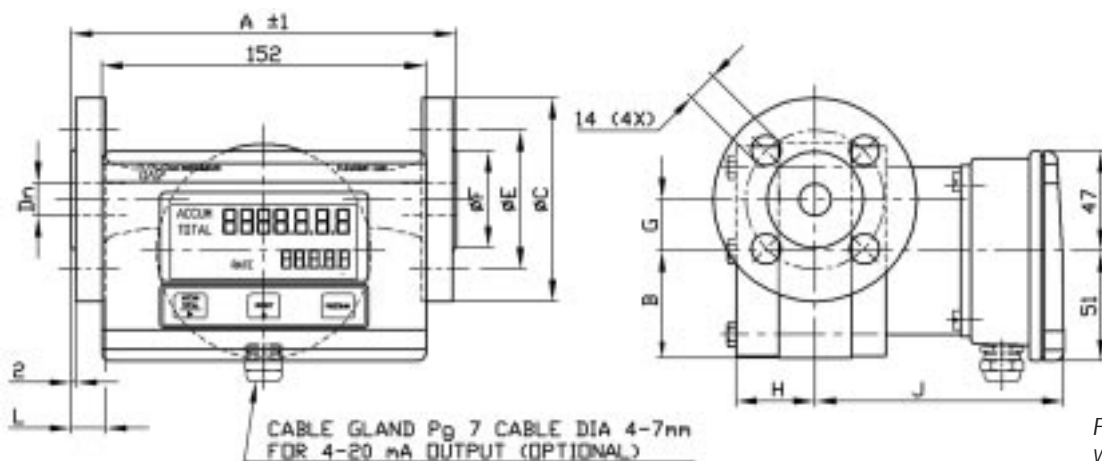


Flanged models PN 40 & 52 with totaliser and optional inductive pulse transmitter

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
J 1015/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
Build-in 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
J 1015/J3015	DN 15	180	50	95	65	45	24	37	116	16
J3023	DN 25	220	50	115	85	68	24	37	116	18

