



P R O D U C T B U L L E T I N

110

Series 'M' Milliflow® Piston Meters DN 8 - 12 mm

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® piston flowmeters, operating on the positive displacement principle, are used in continuous metering applications, in-line blending processes and batch applications.

The accuracy of the Milliflowmeter is better than 0,5% and the repeatability is 0,05%.

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 m³/hr). LoFlow® flowmeters cover the lower part of the range.

Available LoFlow® Milliflowmeters

Milliflowmeters are available in connection sizes from 8 mm up to 12 mm representing maximum flow ranges from 1 l/hr up to 200 l/hr. For registration of the measured amount of liquid VAF LoFlow® meters can be fitted with various combinations of counters and pulse transmitters.

Liquids

VAF Milliflowmeters are suitable for a wide range of liquids; acids, alkalines, cleansing liquids, solvents, water, edible oils and fats, liquor, glucose, paint, all kind of petrochemical liquids, alcohol, printing ink, glue and many other organic and inorganic liquids.

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Principle of operation

Operating on the positive displacement principle the flowmeter consists of four radial pistons, actuated in turn by the head pressure of the liquid. The pistons are linked to a crankshaft which is connected by a magnetic coupling to an LCD type rate-totaliser, or to a mechanical totaliser with or without electric pulse transmitter.

Features

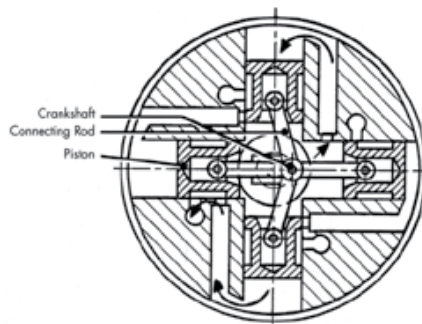
- Designed for rough industrial environments as well as for laboratory use.
- Dependable micro-precision piston operation.
- Measuring accuracy better than $\pm 0.5\%$ of rate.
- Handles viscosities up to 500 mPa.s (consult factory for higher viscosities).
- Local totaliser and/or pulse transmitters according NAMUR for data processing.
- Pressure ratings up to 100 bar.
- Test certificates according EN 10204 2.2 or EN 10204 3.1 can be provided.

Benefits

- Blending and batching system accuracy. Saves on raw materials. Consistent end-product quality.
- Handles wide variety of liquids.
- Easy to install and operate.
- A full line of display and signal processing instrumentation, including flow computers, available from one supplier.

Available models

- Milliflow meter with mechanical totaliser and optional inductive pulse transmitter.
- Milliflow meter with FlowCount Rate Totaliser.
- Non-indicating Milliflow 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 EEx 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.



Sectional view of piston meter.

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 & Pulse Box

Series 'M' LoFlow® Milliflowmeters 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.

Flow range and pulse rate

N = Number of pulses per revolution of the crankshaft.

Table A - Flowmeters with **inductive pulse transmitter in totaliser**

Meter Model No.	Connection size mm (inches)	Flow range (litres/hr)	Pulse rate (pulses/ml)					
			N=1	N=2	N=5	N=10	N=20	N=25
M31	DN 8 (1/4")	1-20	0.01, 0.5	1	2,5	0.1, 5	10	12,5
M32	DN 12 (3/8")	10-200	0.001, 0.05	0.1	0.25	0.01, 0.5	1	1,25

Table B - Non-indicating flowmeters with **inductive pulse transmitter in pulse box**

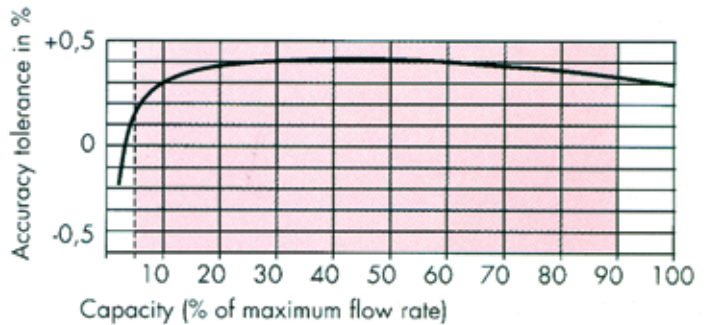
Meter Model No.	Connection size mm (inches)	Flow range (litres/hr)	Pulse rate (pulses/ml)						
			N=1	N=2	N=5	N=10	N=20	N=25	N=50
M31	DN 8 (1/4")	1-20	0.5	1	2,5	5	10	12,5	25
M32	DN 12 (3/8")	10-200	0.05	0.1	0.25	0.5	1	1,25	2.5

Table C - Non-indicating flowmeters with **incremental pulse transmitter in pulse box**

Meter Model No.	Connection size mm (inches)	Flow range (litres/hr)	Pulse rate (pulses/ml)		
			Incremental		
			N=100	N=250	N=500
M31	DN 8 (1/4")	1-20	50	125	250
M32	DN 12 (3/8")	10-200	5	12.5	25

Typical accuracy

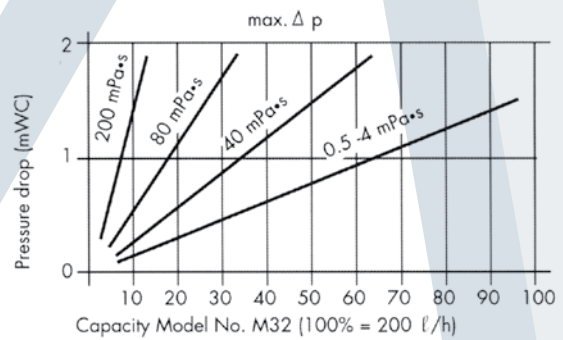
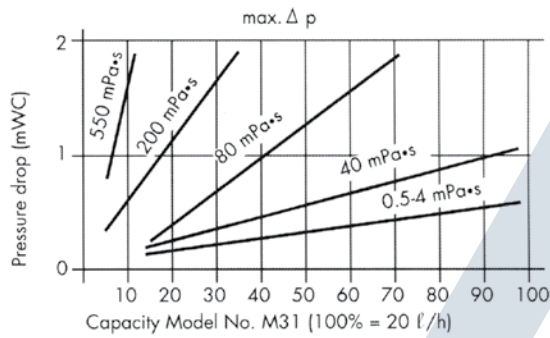
Limits in red area are guaranteed by factory calibration.
Within a narrower measuring range the accuracy will be better.



Technical specifications

Connections	
Pipe couplings	: Model M31 : 8 mm, 12 mm, Model M32 : 12 mm.
Male thread	: Model M31 : 1/4" NPT; Model M32 : 3/8" NPT.
Flanges	: DIN DN 15 and DN 25 PN 10/16/25. 1/2 " and 1 " ANSI class 150 or 300 RF. Other flanges consult factory.
Materials:	
Body	: AISI 316.
Bearings	: Rulon, AISI 316 at extra cost.
Packing	: Gylon (Teflon compound).
Seal ring	: PTFE, AISI 316 at extra cost.
Cylinder linings	: Carbon, ferralium at extra cost.
Temperature	: Liquid -15 to 75°C; Ambient: -15 to 55°C.
Body pressure rating	: PN 25, 35 and 100 bar.
Counter reading	
Red pointer	: Model M31 : 0.01 litre Model M32 : 0.1 litre
Counter	: Model M31 : 0.1 litre, Model M32 : 1 litre
Minimum starting pressure	: Approx. 5 kPa
Accuracy at 2 mPa.s	: Better than +/- 0.5% of rate
Reproducibility	: +/- 0.05%
Viscosity	: Up to 500 mPa.s is standard.
Consult VAF Instruments for higher viscosities.	
Mounting	: In horizontal process piping with counter on top. Wall mounting bracket optional on models with pressure rating to PN 35 bar.
Flow direction	: Left-to-right is standard. For right-to-left the counter or pulse transmitter box can be turned 180 degrees.
Liquid filter	: Particles larger than 0.05 mm must be filtered out by installing a suitable filter at the inlet of the flowmeter.
Pulse transmitters	
Inductive type	: 1 or 2 passive proximity switches according DIN 19234 (NAMUR). Protection class IP55, intrinsically safe according PTB No. 99 ATEX 2219X and Cenelec EEx ia/ib IIC T6, if used with a suitable safety barrier.
Incremental type	: Includes pulse discriminator. Supply voltage 12-35 VDC. Max. frequency 5 kHz.

Pressure drop



Applications

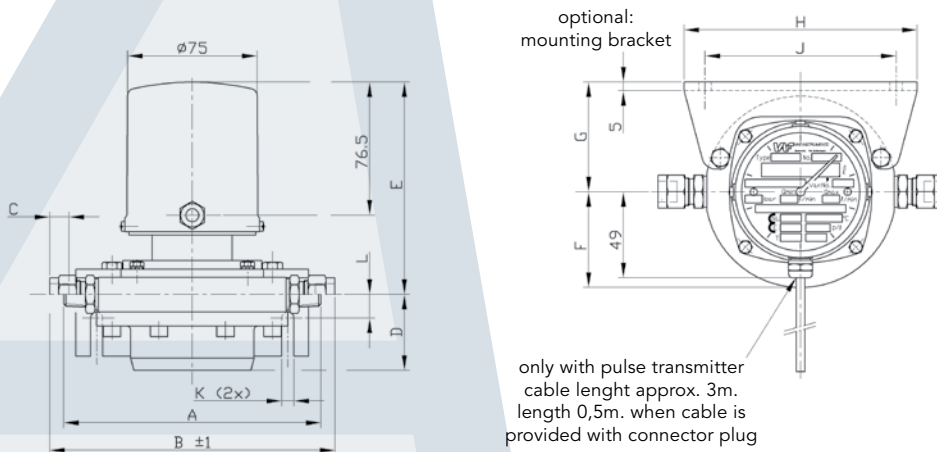
The Milliflow meter is widely used for flow measurement, batching and in-line blending operations in the process industry, pilot plants and laboratories, e.g.:

- Colouring fuel oil, textile, paper, leather and plastics.
- Paint regulation in automatic spray booths.
- Blending of additives with oils and fats.
- Applying corrosion inhibitor fluid to prevent oxidation of metal surfaces.
- Blending of freon with polythene.
- Dosing of additives to concrete mixers.
- Calibration of positive displacement pumps.
- Control of catalysts in chemical reactors.
- Addition of chemicals to boiler feed water.
- Accurate filling of hydraulic shock absorbers.
- Applying emulsion adhesives to audio and video tapes or photographic materials.
- And many other applications.

Dimensions

Except where noted all dimensions are in millimetres.

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

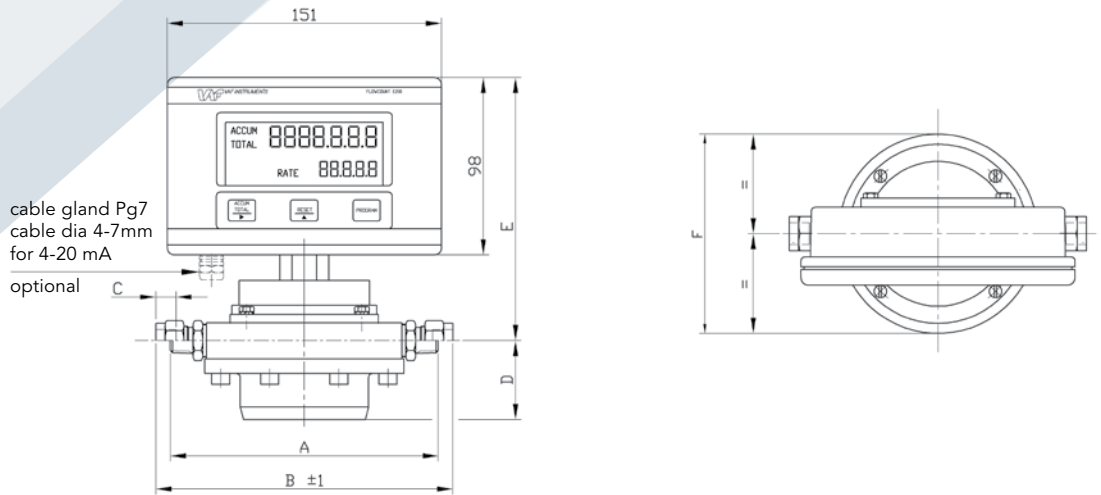


Options:

- * Mounting bracket (PN 25 & 35 bar models only).
- ** Pulse transmitter: connecting plug at end of cable.

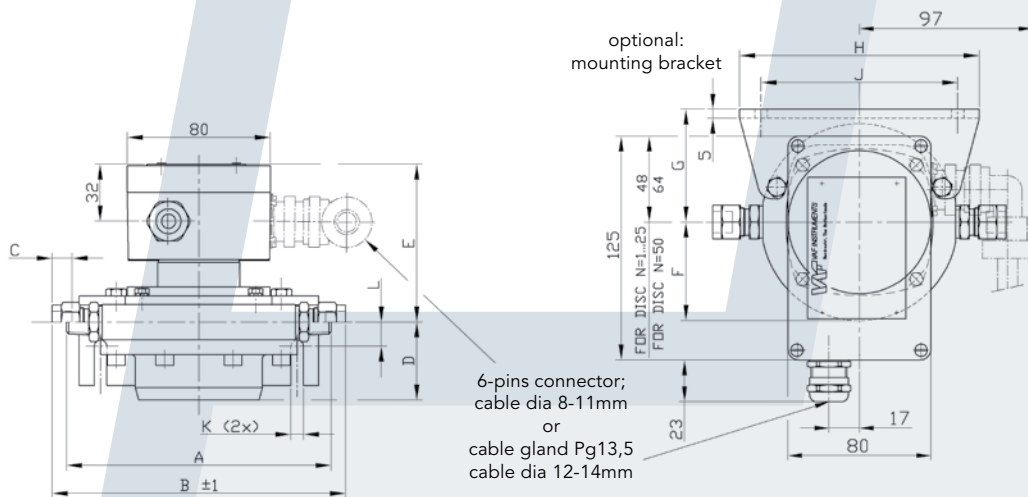
Milliflow meters PN 25 and PN 35 with totaliser and optional inductive pulse transmitter

Model No.	connections size						D	E	F	G	H	J	K	L	weight max. (kg)
	1/4" NPT	3/8" NPT	pipe couplings												
			8mm		12mm										
M31	A	A	B	C	B	C	44	121	55	63	134	110	7	14	4
M32	-	207	-	-	226	11	76	123	85	93	190	160	10	12	11



Model No.	connections size						D	E	F	weight max. (kg)
	1/4" NPT	3/8" NPT	pipe couplings							
			8mm		12mm					
A	A	B	C	B	C					
M31	148	-	158	8	164	11	44	146	110	6
M32	-	207	-	-	226	11	76	148	170	9

Milliflow meters PN 25 and PN 35 with FlowCount rate-totaliser



Options:

- * Mounting bracket (PN 25 & 35 bar models only).
- ** Pulse transmitter: 6-pin connector or cable gland.

Milliflow meters PN 25 and PN 35 with non-indicating inductive or incremental pulse transmitterbox

Model No.	connections size						D	E	F	G	H	J	K	L	weight max. (kg)
	1/4" NPT	3/8" NPT	pipe couplings												
			8mm		12mm										
A	A	B	C	B	C										
M31	148	-	158	8	164	11	44	92	55	63	134	110	7	14	4
M32	-	207	-	-	226	11	76	94	85	93	190	160	10	12	11

Ordering information

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

Fluid data:

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

Flowmeter data:

Check as required.

8. Basic model number M31 M32
9. Connections: threaded pipe couplings
 DIN flanges ANSI flanges
 flange size: DN 15 (1/2") DN 25 (1")
10. Local counter totaliser no local counter (continue with step 11)
 totaliser with inductive pulse transmitter
 no. of pulse generators (max.2): _____ ; No. of pulses/ml: _____
 FlowCount Rate Totaliser;
 reading unit: ml; litres; per minute; per hour
 other reading unit: _____
 FlowCount options:
 4-20 mA output
 intrinsically safe
 other options consult factory

11. Non-indicating pulse transmitter (for pulse rates see tables on page 4)
 Inductive pulse transmitter with pulse discriminator without pulse discriminator
 No. of pulse generators (max.2): _____ ; no. of pulses/ml: _____
 6-pin connector, cable gland (not when pulse discriminator is installed)
 Non-indicating incremental pulse encoder with pulse discriminator pulses/ml,
 6-pin connector, cable gland
 active pulse output, open collector output

Options and accessories

12. Wall mounting bracket (PN 25 & 35 bar models only) required not required
13. Liquid filter required not required
14. Special certification:
 test & inspection certificate acc. EN 10204 2.2, acc. EN 10204 3.1
 custody transfer calibration
 standard factory accuracy calibration
 MID
 other (please specify) _____

15. Associated electronic signal processing instrumentation (please specify) _____

16. Name: _____ Place and date: _____



Specifications subject to change without notice.
Agents and distributors in more than 50 countries

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