

LoFlow[®]

Series 'M' Milliflow[®] Piston Meters

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LoFlow[®] Series 'M' Milliflow[®] meters provide extremely accurate volumetric measurement of corrosive and viscous liquids over a range of 1 to 200 l/h and pressure ratings to 200 bar.

Applications

The Milliflow meter is widely used for flow measurement batching and in-line blending operations in the process industries, 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.

Features

- Designed for rough industrial environments as well as for laboratory use.
- Dependable micro-precision piston operation.
- Measuring accuracy better than +/- 0.5% of rate.
- Handles viscosity up to 500 mPa·s (consult us for higher viscosities).
- Local totaliser and/or pulse transmitters according NAMUR for data processing.
- Pressure ratings to 200 bar.
- Test certificates according EN 10204 2.2 or EN 10204 3.1 B can be provided.

User benefits

- Blending and batching system accuracy. Saves on raw materials. Consistent end-product quality.
- Calibration and material certificates can be provided.
- 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.



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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.

Available models

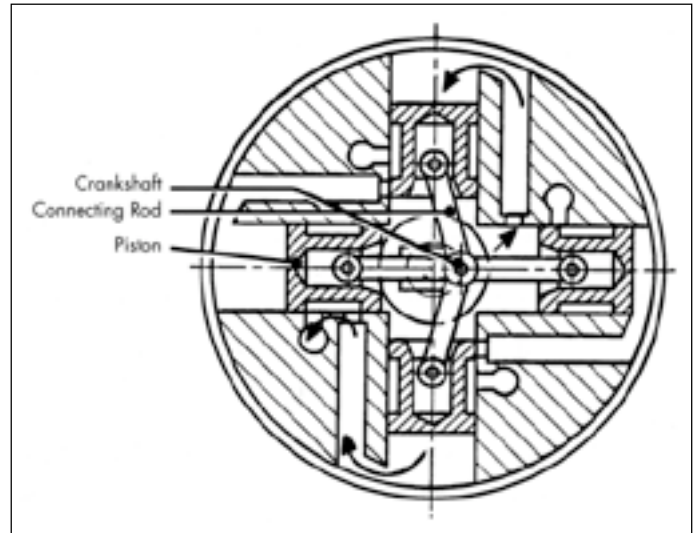
- Milliflow meter with mechanical totaliser and optional inductive pulse transmitter.
- Milliflow meter with FlowCount Rate Totaliser.
- Non-indicating Milliflow meter with pulse transmitterbox
Transmitter variants:
 - Inductive pulse transmitter with optional pulse discriminator. 1 or 2 passive proximity switches acc. NAMUR DIN 19234. Protection class IP55. Intrinsically safe acc. PTB No. 99ATEX2219X and Cenelec EEx ia/ib IIC T6, if used with a suitable safety barrier.
 - Incremental pulse encoder, comprising a double pulse generator and a pulse discriminator. Open collector or active pulse output.

Pulse discriminator

The pulse discriminator prevents measurement errors caused by pipeline vibrations and unsteady flow conditions. The system comprises two inductive or incremental pulse transmitters and a small printed circuit board. The unit is used as standard with incremental pulse encoders and is optional with inductive pulse transmitters. The pulse discriminator is not available with the magnetic pulse transmitter.

Series E200 FlowCount Rate Totaliser

The Rate Totaliser is battery powered and has no need for external power. The instrument is housed in a watertight enclosure according IP67 and NEMA 4X standards and is mounted directly on the flowmeter. Model E200 is fully programmable with the K-factor, decimal point positions, filter constants and time base being programmed via the front panel switches. Rate and totals can be displayed in different engineering units such as millilitres, litres, gallons or cubic metres, per minute or per hour. An intrinsic safe version is available for batching operations and for use in hazardous areas. Other options include a two-wire 4-20 mA output which provides a fast response to changes in flowrate. 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 alarm. The mA option and the flow alarm option can not be combined in one instrument.



Sectional view of piston meter.

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 transmitters 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

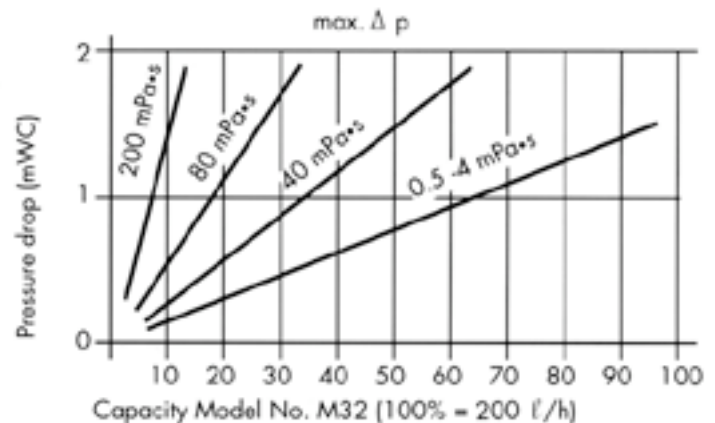
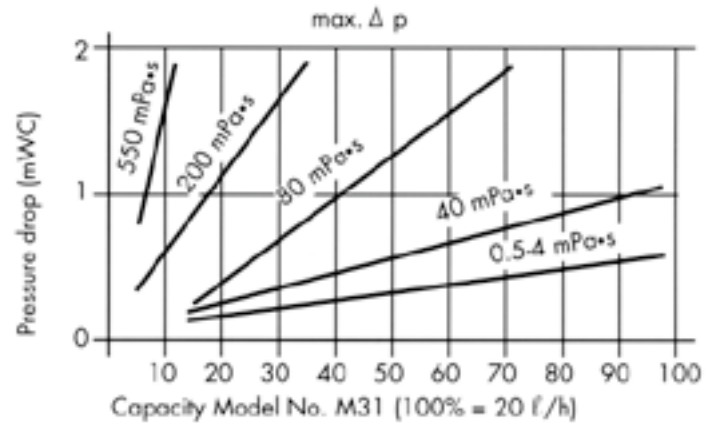
Table C - Non-indicating flowmeters with incremental or magnetic pulse transmitter in pulse box

Meter Model No.	Connection size mm (inches)	Flow range (litres/hr)	Pulse rate (pulses/ml)			Magnetic
			Incremental			
			N=100	N=250	N=500	N=9
M31	DN 8 (1/4")	1-20	50	125	250	4.5
M32	DN 12 (3/8")	10-200	5	12.5	25	0.45

Technical specification

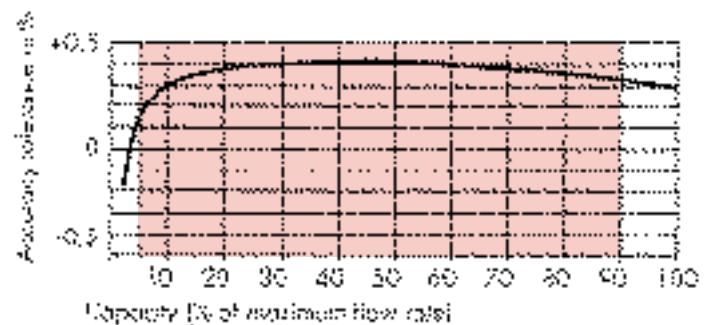
Connections	
Pipe couplings	: Model M31: 8 mm, 12 mm, Model M32: 12 mm.
Male thread	: Model M31: 1/4" NPT; Model M32: 3/8" NPT.
Flanges	: DIN DN 15 and DN 25 PN 10/16/25. 1/2" and 1" ANSI class 150 or 300 RF. Other flanges consult factory.
Materials: Body	: AISI-316.
Bearings	: Rulon, A151-316 at extra 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. Flowmeters with magnetic pulse transmitter PN 160 and 200 bar only.
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. 50 cm WC.
Accuracy at 2 mPa·s	: Better than +/- 0.5% of rate
Reproducibility	: +/- 0.05%
Viscosity	: Up to 500 mPa·s is standard. Consult us 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 trans- mitter 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 LiC T6, if used with a suitable zener-barrier.
Incremental type	: Includes pulse discriminator. Supply voltage 12-35 VDC. Max. frequency 5 kHz.

Pressure drop



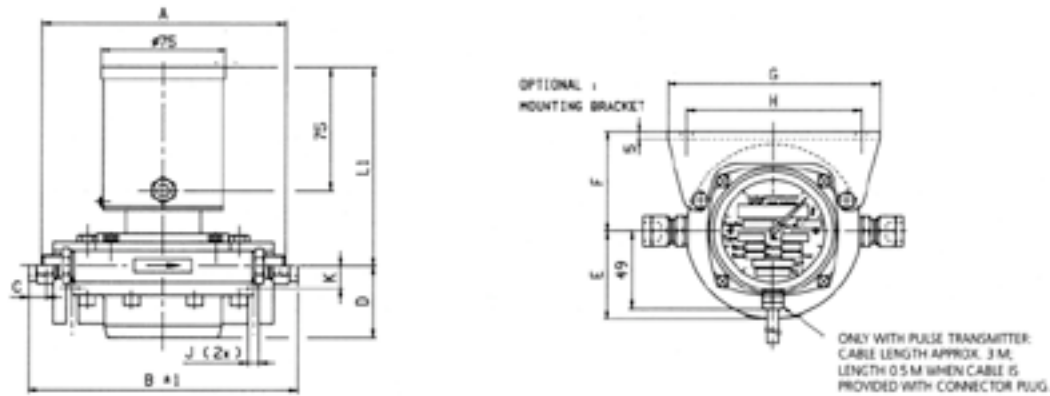
Typical accuracy

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



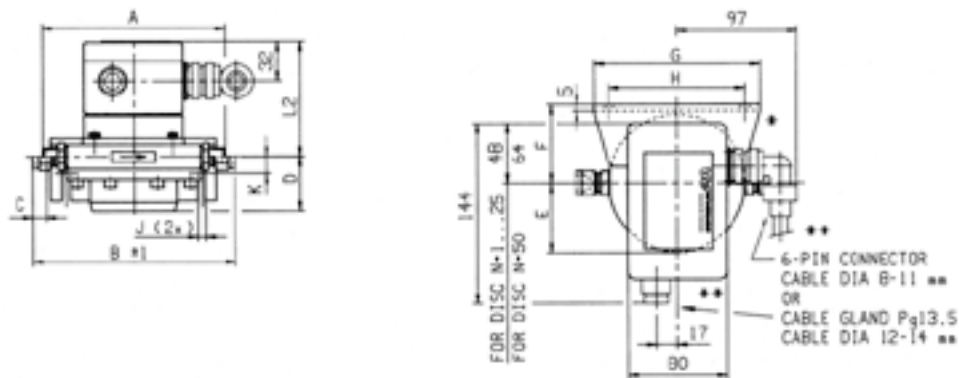
Dimensions

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



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

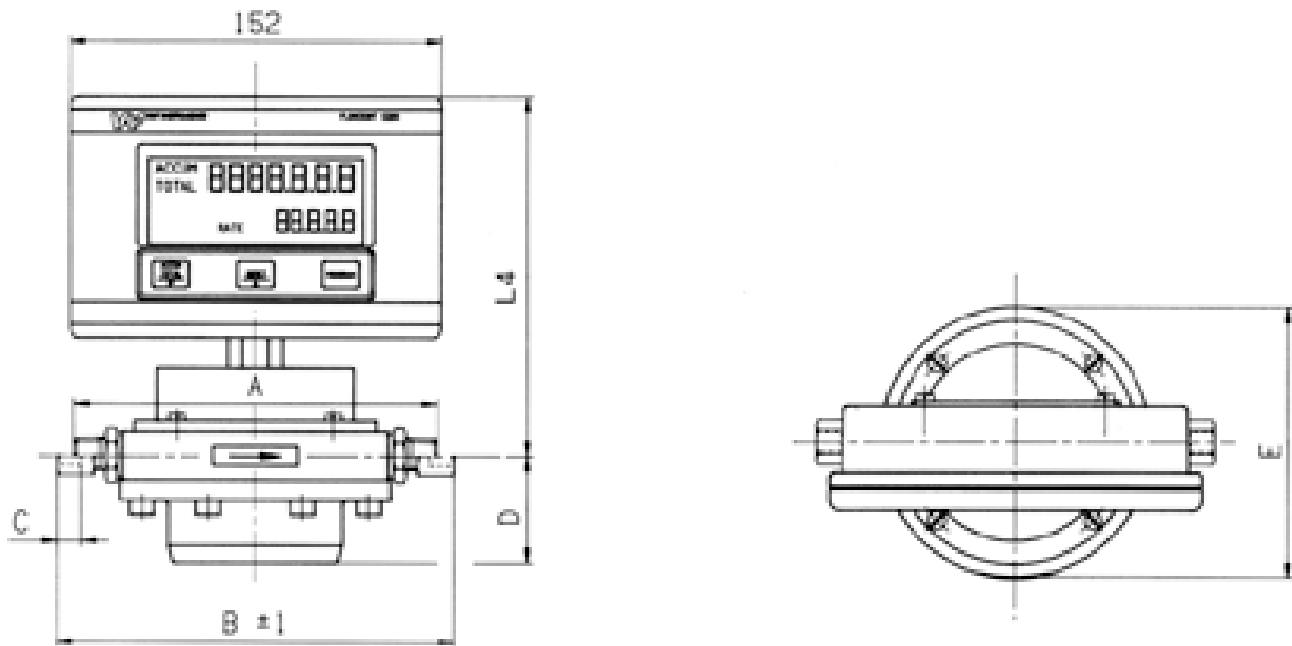
Options:
 * Mounting bracket (PN 25 & 35 bar models only).
 ** Pulse transmitter: connecting plug at end of cable.



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

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

Model No.	1/4" NPT A	3/8" NPT A	pipe couplings				D	E	F	G	H	J	K	L1	L2	L3	Approx. weight (kg)
			8mm		12mm												
M31	148	-	158	8	164	11	44	56	63	134	110	7	14	121	92	77	4
M32	-	207	-	-	226	11	76	85	93	190	160	10	12	123	94	80	11



Model No.	1/4" NPT A	3/8" NPT A	pipe couplings				D	E	L4	Approx. weight (kg)
			8mm		12mm					
			B	C	B	C				
M31	148	-	158	8	164	11	44	110	146	6
M32	-	207	-	-	226	11	76	170	148	9

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

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 other 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, **or:** high & low flow alarm
 configuration for batching purposes
11. Non-indicating pulse transmitter (for pulse rates see tables on page 2)
 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)
13. Liquid filter
14. Special certification:
 Test & inspection certificate acc. EN 10204 2.2, acc. EN 10204 3.1 B
 Custody transfer calibration
 Standard factory accuracy calibration
 Other (please specify) _____
15. Associated electronic signal processing instrumentation (please specify) _____



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