



# PENTRONIC

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Originalspecifikation till  
Pentronics instrumentprogram

[www.pentronic.se](http://www.pentronic.se)





## LFM 10 Micro Flow Meter

The LFM is a new flow meter for all kinds of low-viscosity fluids in batching and filling applications. It facilitates the measurement of extremely low flow rates from 5 cm<sup>3</sup>/min upwards.

The heart of the internal construction is a *double ringpiston*. Thanks to the low mass of the piston and minimum frictional loss, the LFM will respond even to extremely low flow volumes. In addition, the piston principle minimises leakage and guarantees for a good linearity and repeatability.

For the LFM full patent and legal protection of registered design have been applied for with respect to the new Micro Flow Meter.

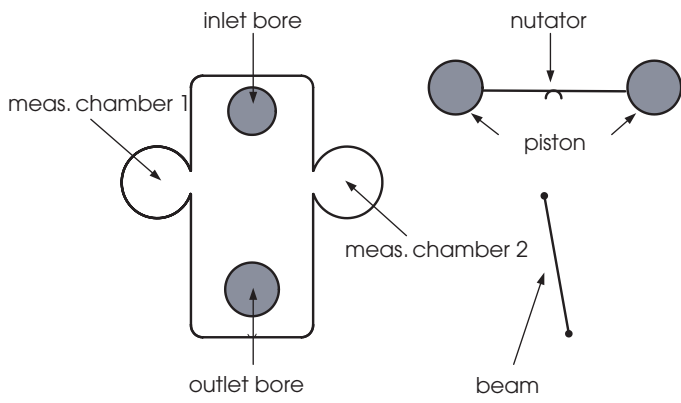


The LFM 10 is compact and has a low weight of only 650g incl. pickup. Nevertheless, it is made from stainless steel like all KEM flow meters. A filter is supplied with each LFM.

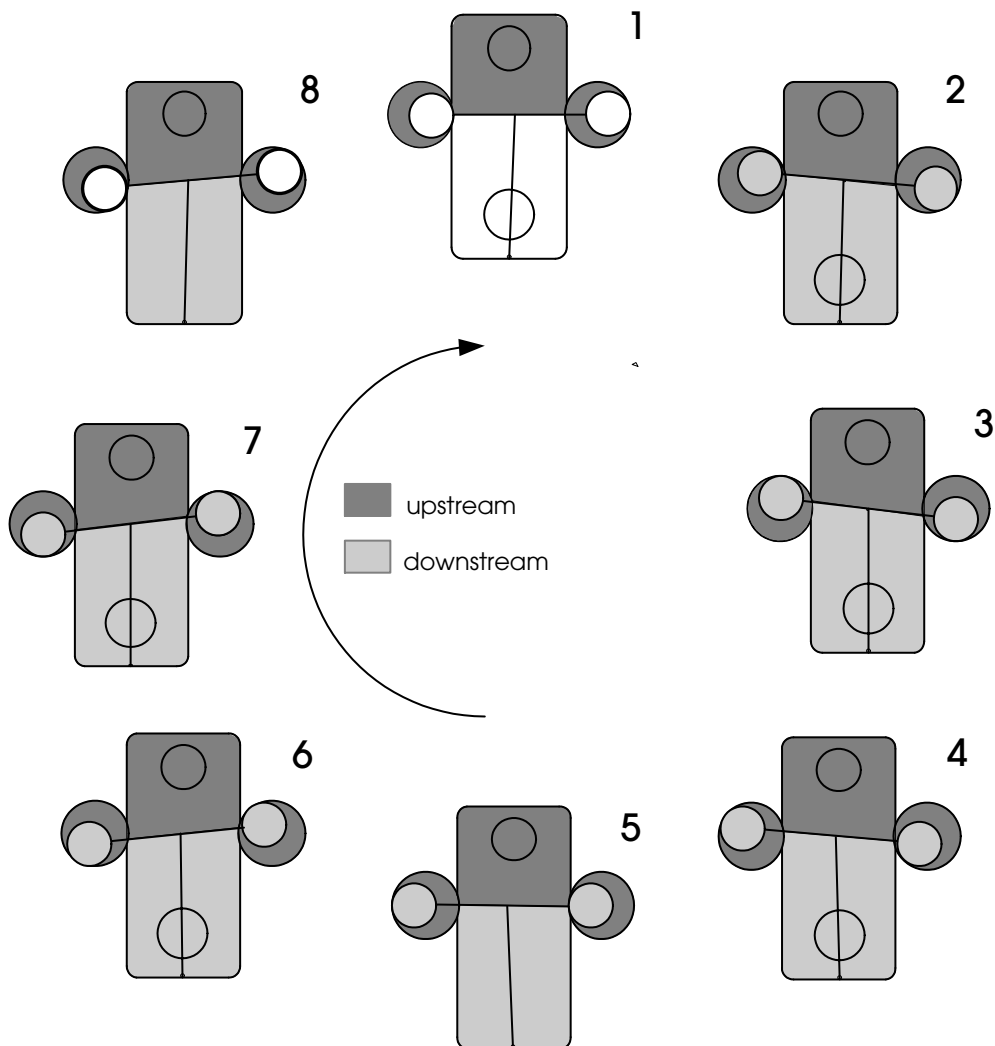
### Typical Applications

- Additives
- Pharmaceuticals (good purging qualities)
- Aromatic substances/perfumes
- Tap-water and demineralised water
- Liquefied gases
- Fluid food
- 2- and 3-component-applications

## Design and Principle



## Functional Scheme



## Explanations on the Functional Scheme

Positions 1 and 5 show the measuring chambers 1 and 2 completely filled with the measuring medium. Both volumes are displaced by the pistons in each full cycle as described below:

Position 1: The nutator is in its farthest right travel point. The beam is connected with the nutator and will therefore move with the nutator.

The upstream pressure acts on the upper surface of the nutator. The beam is offset to the right, therefore the medium will force the right-hand piston downwards in a clockwise direction. At the same time, the left-hand piston moves upwards in a counter-clockwise direction.

This movement is caused by the resultant force of the medium on the nutator. Position 1 shows measuring chamber 1 open. Thus a larger part of the surface is exposed to the medium on the right-hand side. The resultant forces accelerate the nutator as shown in position 2.

In position 3 the upstream pressure affects the right-hand surface of the right-hand piston and the upper right-hand surface of the left-hand piston. The nutator and beam are forced along as shown in position 4 and 5. This is because the right-hand piston has more of its surface exposed to the medium. positions 5 and 6 depict the movements and forces on the nutator in exactly the opposite directions of those in positions 1 to 4.

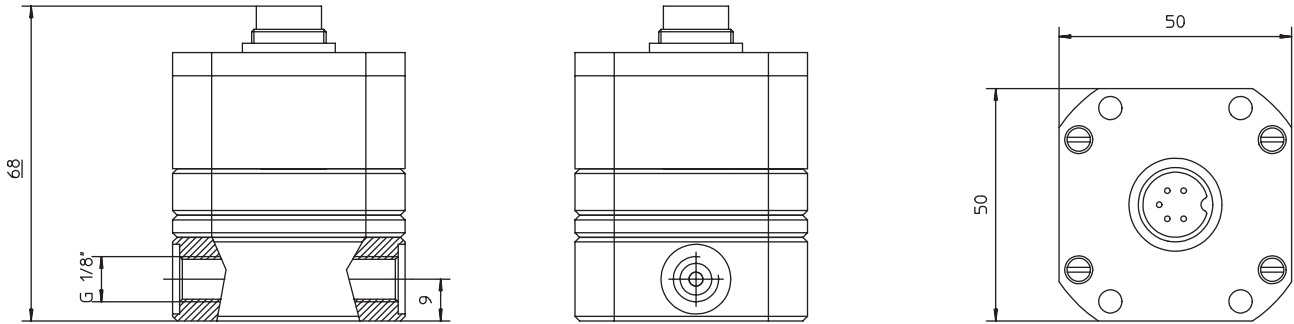
This cycle repeats itself in proportion with a continuous flow at rates of 5 to 230 times per second. A volume of approx. 0.1 cm<sup>3</sup> is displaced in each cycle.

The integral carrier-frequency pickup type VTE.CM detects the oscillating movement of the nutator and beam through the body of the meter and will supply a digital output signal with a frequency which is proportional to the flow volume.

### Technical Data

measuring range:	.0005 up to 0.25 ltr./min
linearity:	±2.5% of actual flow
repeatability:	.0.1%
viscosity range:	.0.6 up to 15 mm <sup>2</sup> /s (from 15 mm <sup>2</sup> /s onwards use ZHM 01 or 01/1)
K-factor:	approx. 55,000 pulses/ltr.
frequency range:	.5 up to 230Hz
connections:	.2 off G 1/8"
pressure:	.100 bar
weight incl. pickup:	.650g
electrical data, VTE.CM:	.passive NPN/open collector
	$U_{high} = U$
	$U_{low} < 0,6 V + (I_{out}(mA) \times 1.3k\Omega)$
	$U_{max} = 30 V$
Ex-protecttion:	.EExiaIICT6

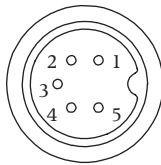
### Dimensional Drawing (mm)



### Electrical Connection

*pin connection VTE.CM*

- 1 = +UB            4 = OC signal (collector)
- 2 = 0 V            5 = OC signal (emitter)
- 3 = n.c.

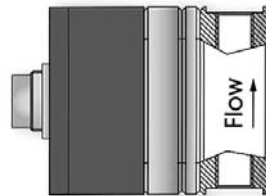


### General Operation Instructions

*mounting position of the LFM*  
vertical with outlet up

*filter*

40 μ required  
filter with 2 off 6 mm »SWAGELOK« connectors included



### Ordering Information

LFM 10 \* \* \* \*

- V = Viton seal
- T = Teflon seal
- F = plug-in pickup type VTE.CM
- SC = stainless steel as per DIN 1.4435 (body) and 1.4122 (internal parts)
- CT = stainless steel as per DIN 1.4305 (body) and 1.4122 (internal parts)