Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

LFM 10

Micro Flow Meter

Index

Application

The LFM is a flow meter for all kinds of low-viscosity fluids in batching and filling applications. It facilitates the measurement of extremely low flow rates from 0.005 ltr./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 additon, the piston principle minimizes leakage and guarantees for a good linearity and repeatability.

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.

Anwendungen

- Additives
- Pharmaceuticals
- Aromatic substances/perfumes
- Tap-water and demineralized water
- Liquefied gases
- Fluid food
- 2- and 3-component-applications

Special:

- Low weight
- Compact Version
- Applicable for flow rates from 0,005 ltr./min
- Good purging qualities

Design and Principle

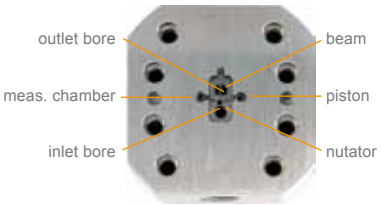
Positions 1 and 5 show the measuring chambers 1 and 2 completely filled with the measuring medium. Both volumes are displaced by the pistons in each full cycle as described below:

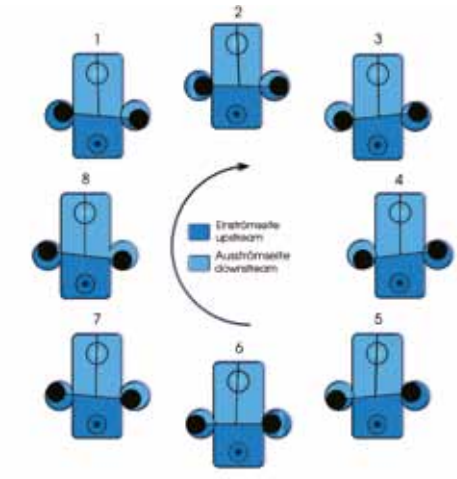
Position 1: The nutator is in its farthest right travel point. The beam is connected with the nutator and will therefore move with the nutator. The upstream pressure acts on the upper surface of the nutator. The beam is offset to the right, therefore the medium will force the right-hand piston downwards 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 approx. 5 to 300 times per second. A volume of approx. 0.01 cm³ is displaced in each cycle.

The integral carrier-frequency pickup type VTE-CM-S 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.

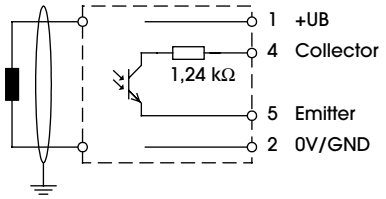
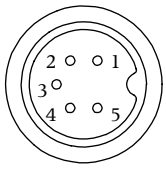




Technical Data

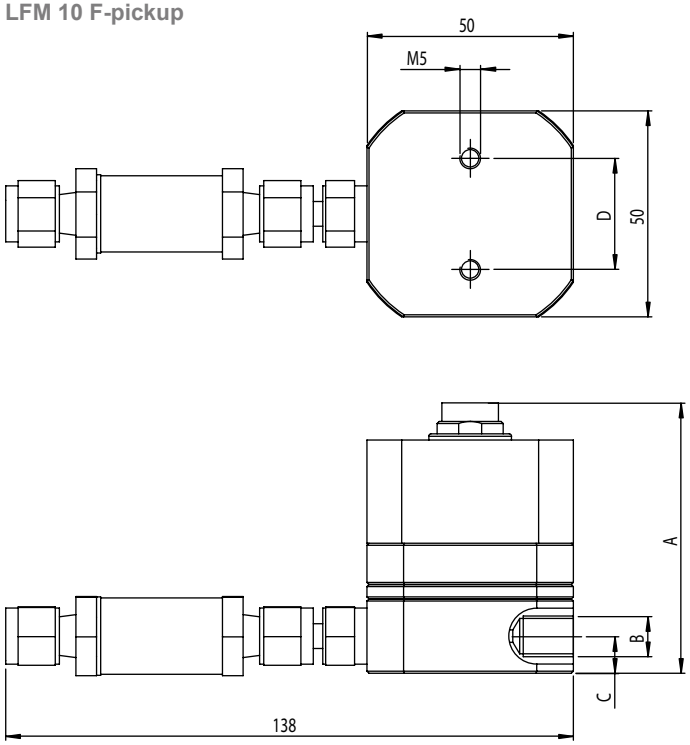
Measuring range	0.005 up to 0.25 ltr./min
Linearity	± 2,5% of actual flow
Repeatability	± 0,1%
Viscosity range	0.6 up to 6 mm²/s
K-factor	approx 75,000 pulses/ltr.
Frequency range	5 up to 312 Hz
Connections	2 off G ⅛" / G¼" / ⅛"NPT
Temperature	up to +70 °C
Pressure	100 bar
Weight incl. pickup	650 g
Materials	housing: stainless steel 1.4435 (SS316L) Housing: stainless steel 1.4122 (SS303) sealing: FKM, PTFE, FFKM (Isolast)

Electrical Connection

VTE-CM-S Verstärker		
supply voltage	9 bis 29 V/DC	
Quiescent current	I_R< 4 mA	
Output signal	passiv NPN/OC U_{high} = U U_{low} < 0,6 V + (I_{out} (mA) x 1,3 kΩ) U_{max} = 30 V	
Pin connection	1 = +UB 2 = 0V 3 = n.c. 4 = OC signal (collector) 5 = OC signal (emitter)	

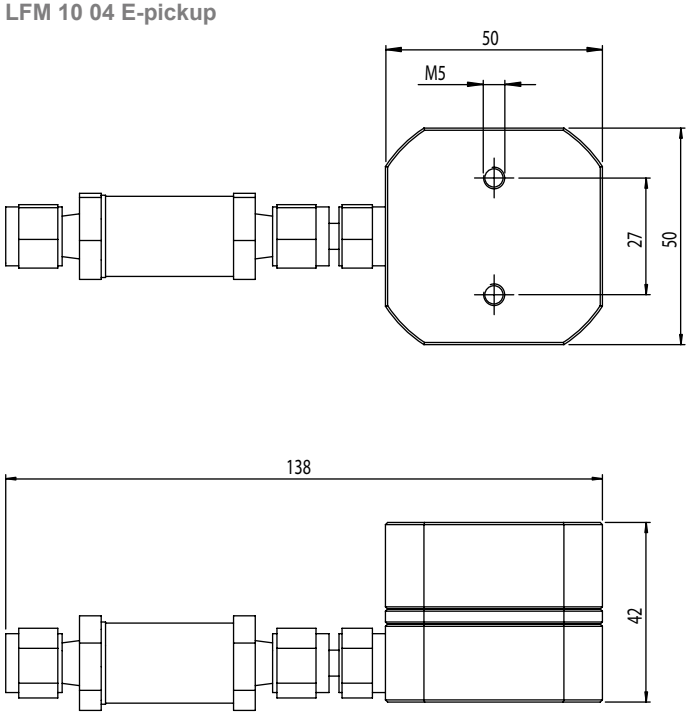
Dimensional Drawings (mm)

LFM 10 F-pickup

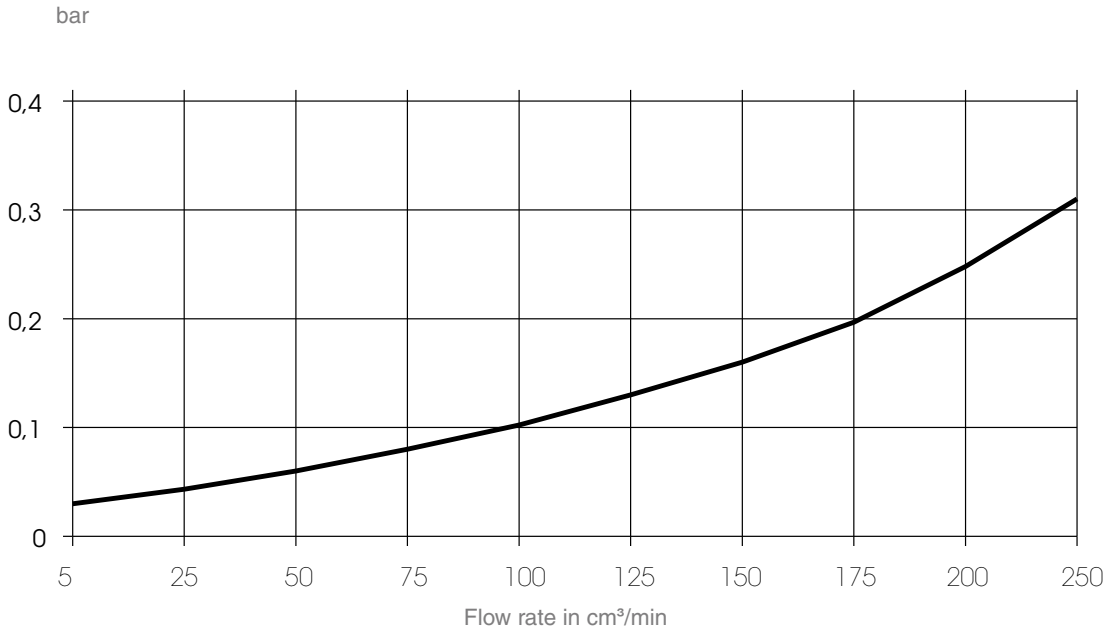


Type	A	B	C	D
LFM 10 CT	65.5	G⅛“	9	-
LFM 10 01	72.5	G¼“	12.5	35
LFM 10 03	65.5	G⅛“	9	27
LFM 10 04	65.5	⅛“ NPT	9	27
LFM 10 SC	65.5	G⅛“	9	-

LFM 10 04 E-pickup



Pressure Drop
at 1 cSt with installed filter



General Operation Instructions

Mounting position of the LFM
vertical with outlet up

Filter
40 µ required
filter for pipe connection AØ 6 mm

Ordering Information

LFM 10 * * * *

V = Viton seal
T = Teflon seal
I = Isolast

F = plug-in pickup type VTE-CM-S
E = screw-in pickup, e.g. VTM local display

03 = stainless steel as per DIN 1.4435 (body)
and 1.4122 (internal parts)

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