

**Operating Instruction  
for  
Micro Flow Meter**

**Model: LFM**



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## **2. Note**

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Please read these operating instructions before unpacking and putting the unit into operation and follow the instructions precisely as described herein.

The instruction manuals on our website [www.kobold.com](http://www.kobold.com) are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email ([info.de@kobold.com](mailto:info.de@kobold.com)) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and with the prevailing regulation applying to procedural safety and the prevention of accidents.

When used in machines, the measuring unit should be used only then when the machines fulfil the EC-machine guide lines.

### **PED 2014/68/EU**

In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

Table 8, Pipe, Group 1 dangerous fluids

## **3. Instrument Inspection**

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Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service/forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

The standard delivery includes:

- Micro flow meter: model LFM
- Connector plug

## 4. Regulation Use

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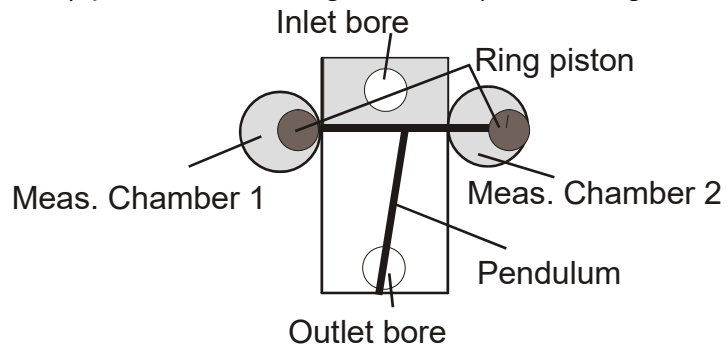
The LFM is a new flowmeter designed for use on clean low-viscosity liquids and is particularly suitable for dosing and filling applications. Extremely low flow rates can be measured down to 0.005 l/min. Care should be taken that liquid which may attack the wetted parts of the flowmeter are not used.

Please ensure that all steps in this manual are observed as the flowmeter's warranty does not cover damage resulting from failure to comply with these instructions.

We recommend a filter with 40 µm mesh size.

## 5. Operating Principle

The measuring mechanism is based on a dual-ring piston pendulum. The right-hand measuring chamber is opened, and the left-hand chamber closed, by the pendulum arm that is inclined to the right. The pressure of the forced liquid acts on the upper surface of the piston pendulum. The right-hand ring piston is pressed clockwise downwards, and the left-hand ring piston is pressed clockwise upwards by the larger surface (opened measuring chamber) on the right. Thus, the right-hand measuring chamber is closed, and the left-hand chamber opened. The surface on the left is now greater – causing motion in the opposite direction. This cycle is repeated with continuous flow at a rate proportional to the flow



rate 1–230 cycles/s. A volume of approximately  $0.01 \text{ cm}^3$  is displaced per pass. The built-in carrier frequency transducer senses the oscillating motion of the piston pendulum and pendulum arm without contact through the case, and outputs a digital signal with a frequency proportional to the volumetric flow. Due to the negligible pendulum mass and minimum friction loss, the LFM detects minimum volumetric flow rates. Leakage loss is minimized by the piston design, which also provides good linearity and repeatability.

## 6. Mechanical connection

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- Please ensure that the permitted values of maximum pressure and temperature are not exceeded.
- The recommended filter size is 40µm.
- The flowmeter should be installed vertically with flow from bottom to top.
- Fibrous seals should be avoided as pieces can cause damage to the unit if they enter the flowmeter. Connection should only be made using a correct fitting and appropriate seal.
- We recommend that you pressure test the unit for leaks after installation.

## 7. Electrical connection

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- When wiring the plug or making electrical connections to the flowmeter please ensure that the power supply is isolated.
- Electrical connections should be made according to the diagram.



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**Attention! Incorrect wiring may cause damage to the electronics. Check!**

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### Plug-Connector

5-pin plug M12 SPEEDCON

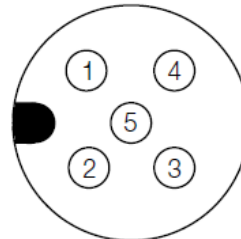
1 = +U<sub>B</sub>

2 = n.c./NAMUR- ("N", "U")

3 = 0 V (not "N")

4 = Signal Push-Pull (not "N")

5 = n.c.



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## 8. Operation

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Please pay attention to the technical data printed on the type-label as well as given in the data sheets.



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**The system must be evacuated from air otherwise the accuracy will be affected.**

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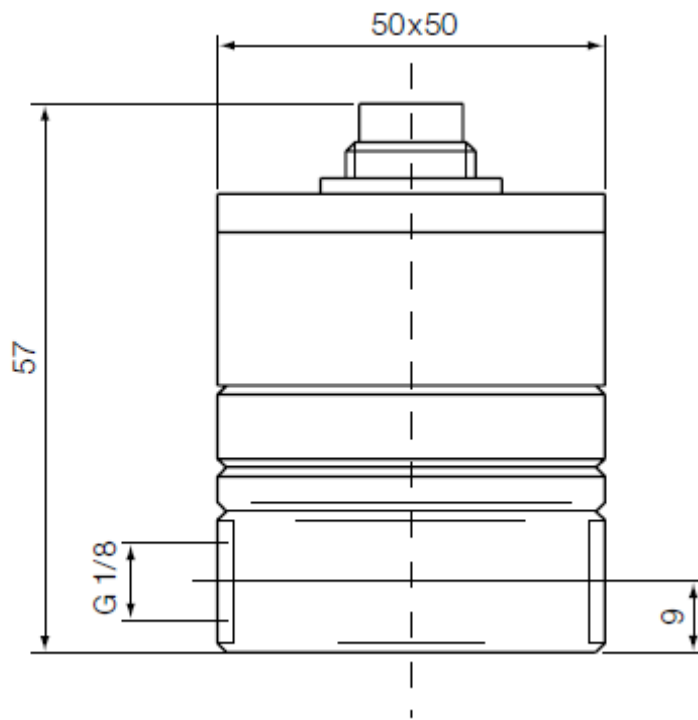
## 9. Technical Information

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Measuring range:	0.005...0.25 l/min
Linearity:	± 2.5 % of reading
Repeatability:	± 0.1 %
Viscosity range:	0.6...6 mm <sup>2</sup> /s
K factor:	approx. 75000 pulses/L
Material:	
Sensor housing:	stainless steel 1.4435
Pendular:	stainless steel 1.4122
Seal:	PTFE, FKM, FFKM
Connection:	G 1/8 female thread (output) 6 mm Swagelock (input), NPT thread on request
Filter:	40 µm; filter with 2x6 mm Swagelok
Max. pressure:	100 bar
Max. Δp:	300 mbar at 5 cSt/0.25 L/min
Max. temperature:	-40 °C...+80 °C
Electrical data:	Push-pull U <sub>max</sub> = 30 V
Electrical connection:	5-pin M12
Installation position:	vertical, flow rate from bottom to top
Weight (with transducer):	approx. 650 g
Protection:	IP 65



## 10. Dimensions



## 11. Disposal

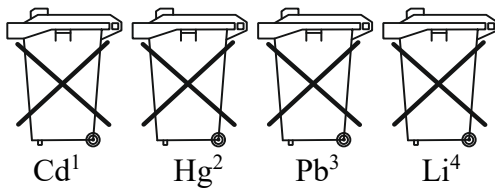
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### Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

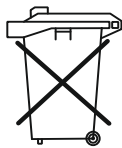
### Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

### Electrical and electronic equipment



## **12. EU Declaration of Conformance**

We, KOBOLD-Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Micro Flow Meter    Model: LFM**

to which this declaration relates is in conformity with the standards noted below:

**EN 61000-6-2:2005**            Electromagnetic compatibility (EMC) - Part 6-2:  
Generic standards - Immunity for industrial environments

**EN 61000-6-4:2007+A1**    Electromagnetic compatibility (EMC) - Part 6-4:  
Generic standards - Emission standard for industrial environments

**EN 61010-1:2015**            Safety requirements for electrical equipment for  
measurement, control, and laboratory use - Part 1: General requirements

Also, the following EC guidelines are fulfilled:

<b>2014/30/EU</b>	<b>EMC Directive</b>
<b>2011/65/EU</b>	<b>RoHS (category 9)</b>
<b>2015/863/EU</b>	Delegated Directive (RoHS III)



Hofheim, 11 Sept. 2019

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