

**Operating Instructions  
for  
Low Volume Rotating Vane  
Flow Meter**

**Model: DPM-...**



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## **2. Note**

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

The instruction manuals on our website [www.koboldusa.com](http://www.koboldusa.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@koboldusa.com](mailto:info@koboldusa.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 in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machinery, the flow meter should only be placed in operation if the machine in use complies with the EEC machinery guidelines.

### **According to PED guideline 2014/68/EU**

No CE marking, see Article 4, Section 3 "Sound engineering practice", Guideline 2014/68/EU

Diagram 8, Piping systems, Group 1 Hazardous fluids

## **3. Instrument Inspection**

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These devices are checked before dispatch and shipped in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of signs of damage to the packaging, please inform your parcel service/forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

- Low Volume Rotating Vane Flow Meter                      model: DPM
- Operating Instructions

## **4. Regulation Use**

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Any use of the Rotating Vane Flow Meter, model DPM, which exceeds the manufacturers specification may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Operating Principles

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KOBOLD model DPM flow meters are used for measuring and monitoring liquids. Due to its compact construction the measuring instrument is suitable for use with machines with minimum available space. The system can be used in a wide variety of applications because the output pulses can be analysed in many different ways.

The media flows through a specially shaped housing nozzle and causes a vane to rotate. This rotary motion is sensed by optoelectronics in a non-contacting manner, and converted to a pulse frequency signal or an analogue signal. A frequency divider with pulse output is available as an option. The frequency is proportional to the flow velocity. The vane is sapphire-supported, this ensures a high degree of linearity and long service life.

## 6. Mechanical Connection

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### 6.1. Check service conditions:

- flow
- max. operating pressures
- max. service temperature



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**Attention! Overage can cause damage to bearings and major measuring errors**

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### 6.2. Installation

- flow in direction of arrow (universal)
- avoid pressure and tensile loads, mechanically fix inlet and outlet lines at distances of 50 mm from the connections
- check connections for leaks

## 7. Electrical Connection

### 7.1. General



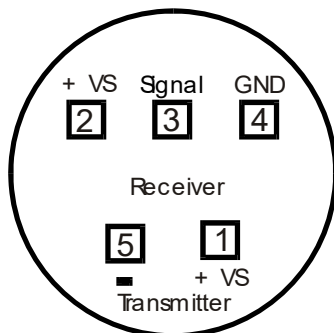
**Attention! Make sure that the voltages in your plant correspond with the flow meter voltages.**

- Make sure that the electrical supply lines are dead.
- We recommend a power supply cable with cross sectional area of 0.25 mm<sup>2</sup>.

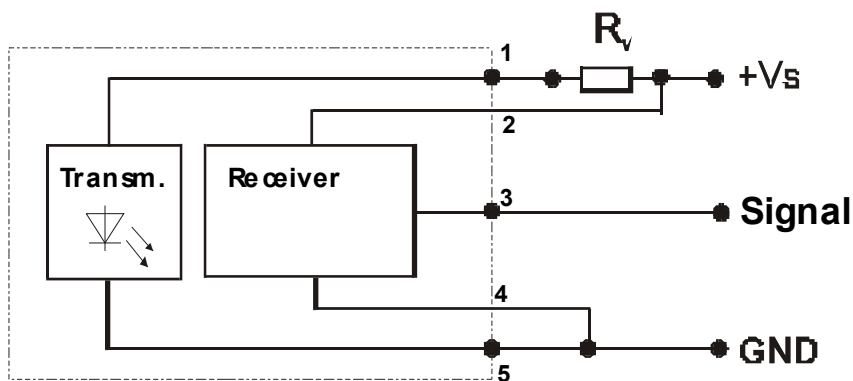


**Attention! The instrument electronics may be damaged if the cable connections are wired incorrectly.**

### 7.2. DPM...0000 (OEM without cable)



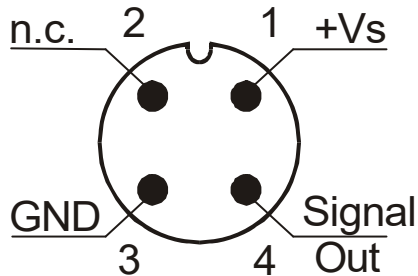
Feed voltage receiver	4,5 ... 16 V <sub>DC</sub>
Feed current receiver	typ. 7 mA
Signal amplitude High	approx. operating voltage
Signal amplitude Low	0,2 V
Reverse voltage transmitter	3,0 V max.
Feed current transmitter	8 ... 12 mA
Output dissipation (power)	2,5 mW max.



V <sub>s</sub>	R <sub>v</sub> *
5 V	470 Ω / 0,25 W
8 V	820 Ω / 0,25 W
12 V	1300 Ω / 0,25 W

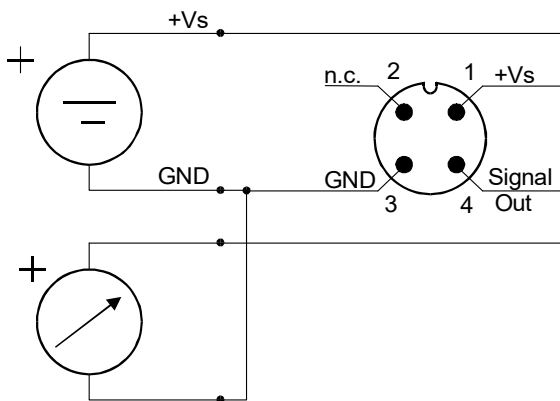
\* Not included in delivery.

## 7.3. Evaluation electronics: Frequency output (..F300;..F320;..F340;..F380)

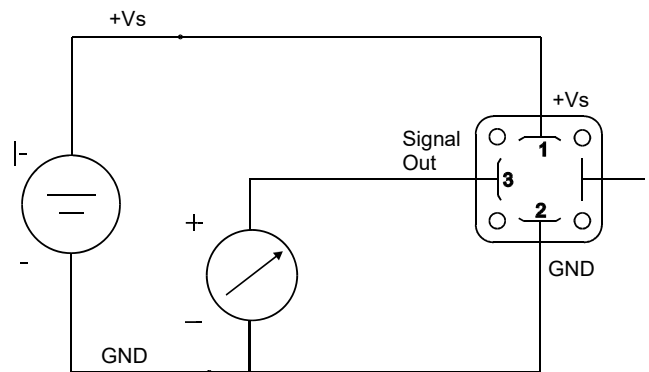


## 7.4. Evaluation electronics: Analogue output (..L..)

3-wire (DPM-..L303, ..L343)

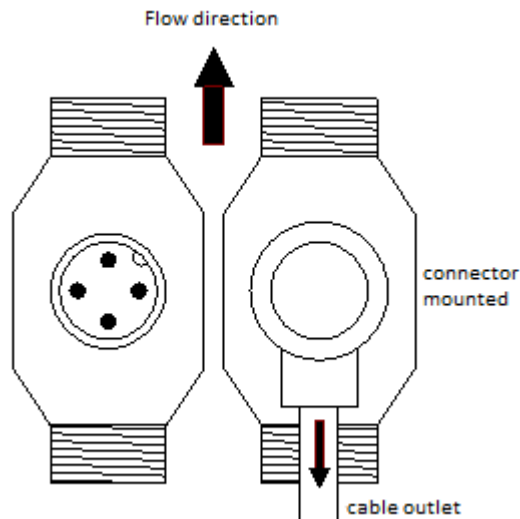


3-wire, DIN 43650 plug connector  
(DPM-..L403, ..L443)



### 7.5. Cable outlet with M12x1 angle plug electronic options F3x and L3x

When using a pre-assembled M12x1 connection cable with angled plug, the cable outlet is always aligned opposite to the flow direction.



### 7.6. Compact electronics: (..C30R, ..C30M, ..C34P, ..C34N)

See supplement Operating Instructions  
for compact electronics with frequency output

## 8. Operating – Evaluation Electronics

### 8.1. Frequency output

The measuring instruments are ready for operation after electrical connection.

### 8.2. Analogue output

The measuring instruments are ready for operation after electrical connection.

### 8.3. Compact electronics

The measuring instruments are factory programmed and ready for operation after electrical connection.

(To change the settings, see Operating Instructions supplement for Compact Electronics, C3xx - Compact Electronics Operation Manual)

## 9. Maintenance

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The measuring instrument requires no maintenance if the measured media is clean. To prevent coating the sensor optics, we recommend that a filter is installed, for example the magnetic filter, model MFR.

If the sensor has to be cleaned, then it can be opened to gain access to the inside parts. Make sure that the sensor and especially the blades are not damaged. When re-assembling, make sure that the vane is positioned and oriented correctly.

Work on the sensor and electronics should only be carried out by the supplier, otherwise the guarantee is nullified.

## 10. Technical Information

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### 10.1. Sensor data

Measuring accuracy:	
DPM..000, F300	± 2.5% f. s.
DPM...L, ...C:	± 1% f. s.
Linearity:	± 1% f. s.
Repeatability:	0.5%
Media temperature:	-40... +80 °C
Ambient temperature:	-30... +60 °C
Max. operating pressure:	16 bar
Protection:	IP 65
Materials:	
Case:	brass nickel-plated stainless steel 1.4404
Upper part:	brass nickel-plated stainless steel 1.4404
Union nut:	brass nickel-plated stainless steel 1.4305
Nozzle:	stainless steel 1.4405
Axle:	sapphire
Vane:	polypropylene
Vane mount:	polysulfone
Gasket:	NBR (standard) FPM or EPDM (optional)



## 10.2. Evaluation electronics

### Frequency output (OEM)

Power supply:	4.5-12 V <sub>DC</sub>
Supply current:	typically 7 mA
Signal amplitude high:	approximately power supply
Signal amplitude low:	≤ 0.2 V
Cut-off voltage transmitter:	3 V max.
Supply current transmitter:	8-12 mA
Output loss:	max. 2.5 mW
Pulse output:	NPN, open collector, max. 10 mA
Electrical connection:	solder pins

### Frequency output (frequency divider option)

Power supply:	24 V <sub>DC</sub> ±20%
Supply current:	40-50 mA
Pulse output:	PNP, open collector, max. 20 mA
Signal amplitude high:	power supply level approximately
Signal amplitude low:	≤ 0.2 V
Output loss:	max. 2.5 mW
Pulse output:	PNP, open collector, max. 20 mA
Electrical connection:	plug connector M12x1
Division ratio (option):	1...1/128, factory setting

### Analogue output (plug-on display option)

Power supply:	24 V <sub>DC</sub> ±20%
Output:	0-20 mA or 4-20 mA, 3-wire
Max. load:	500 Ω
Electrical connection:	plug connector M12x1 or DIN 43 650
Option:	plug-on display (with plug connector DIN 43 650 only)

### Compact electronics

Display:	3-segment LED
Analogue output:	(0)4 – 20 mA adjustable, max. 500 Ω
Switching outputs:	1 (2) semiconductor PNP or NPN, factory set
Contact operation:	N/C / N/O contact programmable
Setting:	with 2 buttons
Supply:	24 V <sub>DC</sub> ± 20%, 3-wire technology
Power input:	approx. 100 mA
Electrical connection:	plug connector M12x1

## 11. Order Codes

Note: See KOBOLD USA Datasheet for USA Order Codes  
Order Details (example: **DPM-1107 G1 0000**)

Meas. range [L/min] water	approx. frequency [Hz] at max. value	approx. pressure loss [bar] at max. value	Model		Connection	Electronic analyser
			Material brass	Material st. steel		
0.015 - 0.3	165	0.93	DPM-1103	DPM-1503..		
0.05 - 0.7	228	1.16	DPM-1107..	DPM-1507..		
0.05 - 1.0	217	0.53	DPM-1110..	DPM-1510..		
0.05 - 2.0	344	0.91	DPM-1120..	DPM-1520..	G1.. = G 1/8 fem. G2.. = G 1/4 fem. N1.. = 1/8 NPT fem. N2.. = 1/4 NPT fem.	<p><b>Frequency output, without CE</b></p> <p>..0000 = Frequency output, without cable (OEM), NPN ..F300 = Frequency output, plug connector M12x1, PNP ..F320 = Frequency divider 1:2, plug connector M12x1, PNP ..F340 = Frequency divider 1:4, plug connector M12x1, PNP ..F390 = divider 1...1/128, plug connector M12x1, PNP</p> <p><b>Analogue output</b></p> <p>..L303 = 0 - 20 mA output, 3-wire, M12x1 plug connector ..L343 = 4 - 20 mA output, 3-wire, M12x1 plug connector ..L403 = 0 - 20 mA output, 3-wire, plug connector DIN 43 650 ..L443 = 4 - 20 mA output, 3-wire, plug connector DIN 43 650</p> <p><b>Compact electronics*</b></p> <p>C30R = LED display, 2x open collector, PNP, plug connector M12x1 C30M = LED display, 2x open collector, NPN, plug connector M12x1 C34P = LED display, 4 - 20 mA, 1x open coll., PNP, plug connector M12x1 C34N = LED display, 4 - 20 mA, 1x open coll., NPN, plug connector M12x1</p>
0.05 - 3.0	372	0.61	DPM-1130..	DPM-1530..		
0.05 - 4.0	415	0.57	DPM-1140..	DPM-1540..		
0.05 - 5.0	439	0.57	DPM-1150..	DPM-1550..		

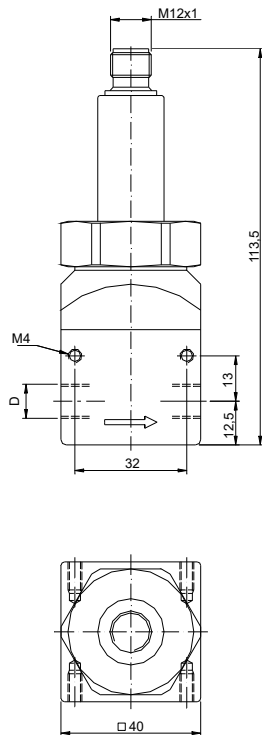
\*Please specify flow direction in writing

Plug-on display  
for model DPM...L443 (with 4-20 mA output and DIN plug connector)

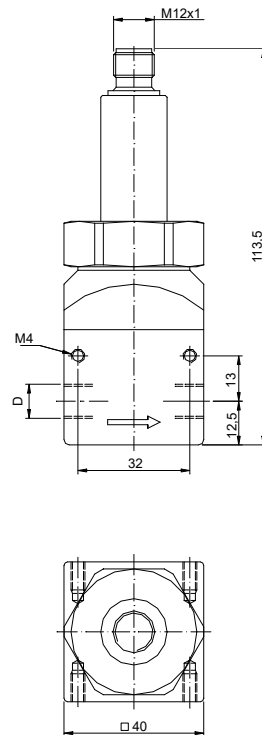
Description	Order number
3-position LED, Plug connector DIN 43 650, 3-wire, Power supply through analogue output	<b>AUF-3000</b>

## 12. Dimensions

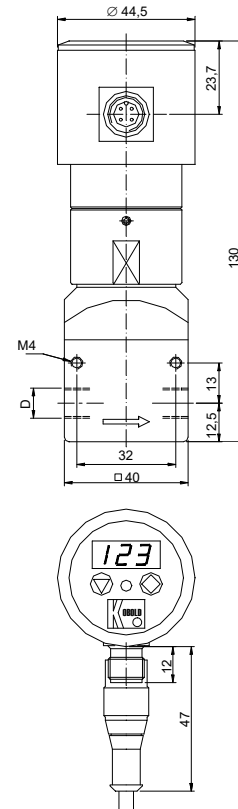
**DPM-...F**  
with frequency output



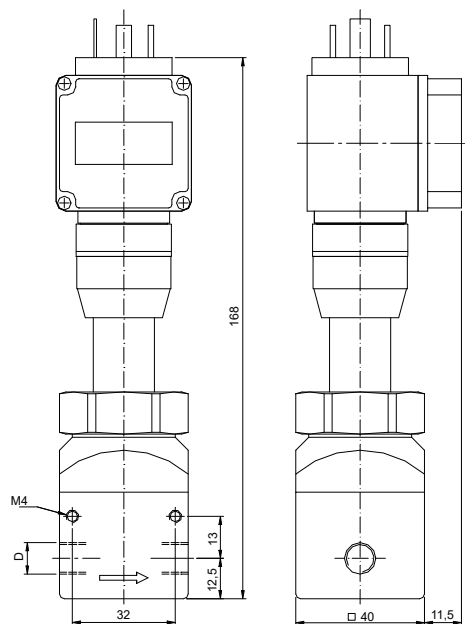
**DPM-..L3**  
with analogue output



**DPM-..C**  
with compact electronics



**DPM-..L with analogue out  
and plug-on display**



## 13. EU Declaration of Conformance

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

**Low Volume Rotating Vane Flow Meter    model: DPM-...**

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

**EN 61000-6-4:2011-09**

Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

**EN 61000-6-2:2005**

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

**EN 61010-1:2011-07**

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

**EN 60529:2014-09**

Degrees of protection provided by enclosures (IP Code)

**EN 50581:2012**

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also, the following EC guidelines are fulfilled:

**2014/30/EU**

**EMC Directive**

**2011/65/EU**

**RoHS (category 9)**

**2015/863/EU**

**Delegated Directive (RoHS III)**



H. Peters  
General Manager



M. Wenzel  
Proxy Holder

Hofheim, 07 Aug. 2019