

# Operating Instruction for Flow Transmitter

**Model: DF-MA**



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## 2. Note

Please read and take note of these operating instructions before unpacking and setting the unit for operation, and follow the instructions precisely as described herein.

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.

By usage 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.

	Pipe	
	Diagram 8 Group 1 dangerous fluids	Diagram 9 Group 2 no dangerous fluids
All DF-models except DF-xxG(H)R32 DF-xxG(H)R40	Art. 4, § 3	Art. 4, § 3
DF-xxGR32../DF-xxGR40	not deliverable	Art. 4, § 3
DF-xxHR32../DF-xxHR40..	Kat. II	Art. 4, § 3
DF-xxHF50..	Kat II	Art. 4, § 3

## 3. Instrument Inspection

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

### **Scope of delivery:**

- Flow Transmitter DF-MA
- Operating Instructions

## 4. Regulation Use

The model DF-MA is installed to measure the flow of liquids.

The instrument provides the following facilities:

### Analogue Output

For the remote transmission of measured flow rates, the instrument is provided with an analogue output (DIN IEC 381) with 0-20 mA or 4-20 (see label).

It is suitable for low viscosity fluids which have no effects on the instrument materials used. If using higher viscosity media large deviations will occur from the flow range as given in the catalogue. Long threads can lead to the seizure of the rotor. Likewise, ferritic particles can build up on the rotating vane and lead to faulty operation or destruction of the rotor. In cases of doubt, please contact the supplier.

### Material Combinations

	Standard version				High-pressure version	
Material combination	I	II	III	IV <sup>1)</sup>	VI <sup>1)</sup>	VII <sup>1)</sup>
Order code	..A..	..B..	..D..	..E..	..G..	..H..
Connection types	Pipe thread	Pipe thread	Pipe thread	Pipe thread flange	Pipe thread	Pipe thread flange
Case	Trogamide	Polysulfone	Brass nickel-plated	St.steel <sup>4)</sup>	Brass nickel-plated	St.steel <sup>4)</sup>
Cover	Trogamide	Polysulfone	Polysulfone	Polysulfone	Brass nickel-plated	St.steel <sup>4)</sup>
Connection	Brass nickel-plated	St.steel <sup>4)</sup>	Brass nickel-plated	St.steel <sup>4)</sup>	Brass nickel-plated	St.steel <sup>4)</sup>
Locking pins	Brass	Brass	Brass	-	-	-
O-rings	NBR	FPM	NBR	FPM	NBR	FPM
Vane	POM	PTFE	POM	PTFE	POM	PTFE
Axle <sup>3)</sup>	St.steel <sup>4)</sup>	St.steel <sup>4)</sup>	St.steel <sup>4)</sup>	St.steel <sup>4)</sup>	St.steel <sup>4)</sup>	St.steel <sup>4)</sup>
Bearing <sup>3)</sup>	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Screen	PTFE <sup>2)</sup>	PTFE <sup>2)</sup>	PTFE <sup>2)</sup>	PTFE <sup>2)</sup>	PTFE <sup>2)</sup>	PTFE <sup>2)</sup>
Max. operating pressure	10 bar	10 bar	16 bar	16 bar	100 bar	100 bar flange PN 40
Max. operating temperature	60 °C	80 °C	80 °C	80 °C	80 °C	80 °C

1) Connection cannot be rotated

2) Stainless St. for model DF 0.5

3) Special version upon request

4) Stainless St. 1.4571, 1.4404

## 5. Operating Principles

A plastic rotating vane rotates on an axle when a flow throughput occurs. A ring shaped magnet hermetically sealed in the rotating vane transmits this rotary motion to a Hall sensor mounted outside of the instrument housing. The electronics mounted on the housing converts the frequency signal into an analogue output.

## 6. Mechanical Connection

### Before installation

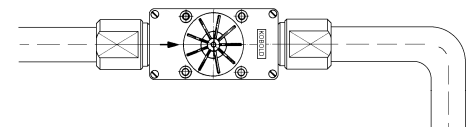
Please ascertain whether the actual flow throughput matches the flow range of the instrument. The flow range may be obtained from the label.

Type DF-MA		
LN $\frac{3}{8}$ "	PN 16 bar	12 ml/h $\pm 0.5$
IP 65		



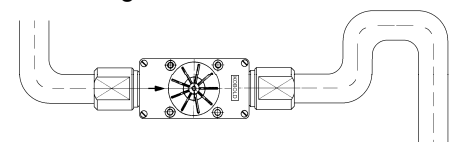
**Warning! If the measuring range is exceeded by more than 20%, bearing damage may occur.**

- Please ascertain whether the allowable maximum operating pressure and operating temperature of the instruments will not be exceeded.
- Make sure that the electrical supply to the instrument conforms with the equipment operating data.
- Remove all transport packing and ascertain that no packing material is left in the instrument.
- The instrument may be installed in any position. However, the flow must always take place in the direction of the arrow, while the front face of the instrument must always be in the vertical plane.
- It must be ensured that the instrument housing is continuously filled with the flow medium, especially for flows from top to bottom. No straight pipe lengths are necessary at inlet and outlet connections.
- Sealing of the connection threads should be carried out with PTFE tape or similar.
- During installation of the instrument, it must be checked that no stress is applied to the connections. We recommend that the inlet and outlet pipes are mechanically fixed approximately 50 mm from each instrument connection.
- When using material combination IIB,IV,V,VI and VII the instrument connections may not be rotated.
- Check that the connection thread to pipe is fully sealed.



wrong!

right!



**Warning! The threaded connections of the instrument must be tightened with a suitably sized open ended spanner. Otherwise, the housing may be stressed which could lead to breakage of the equipment.**

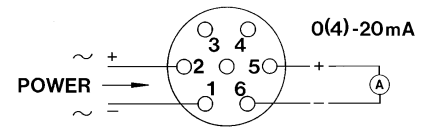
## 7. Electrical Connection

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**Warning! Make sure that the supply voltage to the instrument conforms with the value given on the equipment label.**

- Ensure that the power is disconnected during connection of the cable.
- For equipment with plug connection solder the ends of your supply cables in accordance with the connection plan supplied with the coupling plug.
- For equipment with cable connection simply connect the instrument cable to your supply cable.  
Supply cable cross-section: 0.75 mm<sup>2</sup>.



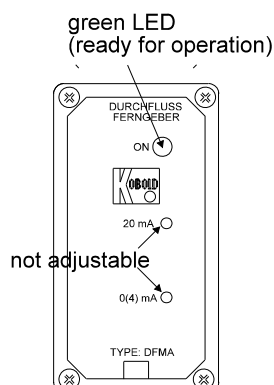
Cable connection:  
No.1 :Power supply (-)  
No.2:Power supply (+)  
No.5:Analogue output (+)  
No.6:Analogue output (-)



**Warning! Incorrect wiring of the connection in the coupling plug or incorrect wiring of the connection cable can lead to the electronics being destroyed.**

- Plug the coupling plug in the socket provided on the equipment (in the case of instruments with plug connections).
- After connection of your external equipment at the connection points the instrument is ready for operation.

## 8. Electrical Commissioning of the Instruments



The instrument is delivered ready to operate. The electronics are matched and calibrated against the signal transmitter. The calibration screws ('ZERO' and 'RANGE') found behind the adhesive foil must not be adjusted by the customer. If they are adjusted, a re-calibration will be required involving new calculations. Should the electronics be opened any warranty will become invalid.

As soon as the external power supply to the instrument is switched on, a green LED will indicate that the unit is ready for operation. #

## 9. Mechanical Commissioning of the Instrument

To avoid pressure surges, the flow medium should be slowly introduced into the instrument.



**Warning! Pressure surges from solenoid valves, ball valves or similar may lead to breakage of the instrument (water hammer). In the operating condition it must be checked that the instrument housing is continuously filled with the flow medium.**

**Warning! Large air bubbles in the instrument housing may lead to measuring errors or destruction of the bearings.**

## 10. Maintenance

For measured media without contamination, the DF-MA instrument is almost maintenance-free. As the rotating vane contains magnets, any ferritic particles present in the medium may lead to problems. In order to avoid such problems we recommend the installation of a magnet filter e.g.: model filter MF-R.

Should cleaning of the instrument become necessary, the housing cover may easily be removed to provide access to the internals. After cleaning, the instrument may just as easily be reassembled. Any work on the electronics may only be undertaken by the supplier; otherwise the warranty will become invalid.

## 11. Technical Information

Power input:	3.5 W max.
Power supply:	24 V <sub>DC</sub> +15% / -10%
	24, 110, 230 VAC ±20%
Output:	(DIN IEC 381) current source 0(4)-20 mA floating, 0-10 V (24 V <sub>DC</sub> non-isolated)
Output load:	0-500 Ω (load)
Protection type:	IP 65, all-insulated
Ambient temperature:	- 25 °C to +80 °C
Accuracy:	± 2.5 % f. s

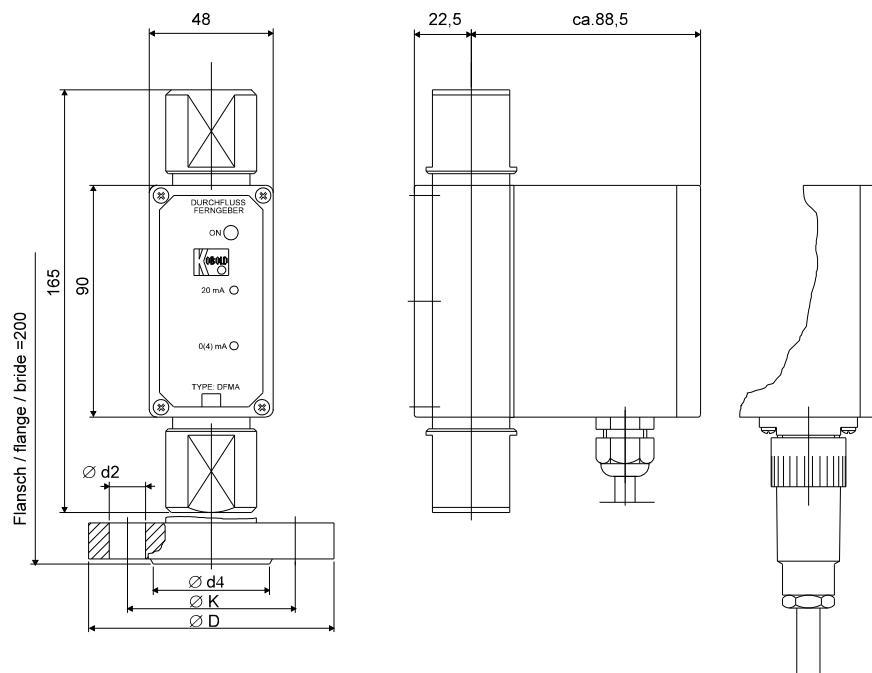
## 12. Order Codes

Example: **DF-05 A R 06 MAK 0 0**

Flow rate L/min	Model	Material combination (see trans- ducer)	Connec- tion*	Connection sizes (see measuring sen- sor for recommended size)	Electronics	Auxiliary power	Analogue output
0.08 - 0.50	<b>DF-05...</b>	<b>A</b> = Trogamide/ Brass <b>B</b> = PSO/VA <b>D</b> = Brass <b>E</b> = St. steel <b>G</b> = Brass, 100 bar <b>H</b> = St. steel, 100 bar	<b>R</b> = G female  <b>N</b> = NPT female  <b>F</b> = Flange DIN 2527, PN 40	<b>06</b> = G 1/8 <b>08</b> = G1/4 <b>10</b> = G 3/8 <b>15</b> = G 1/2, DN 15 <b>20</b> = G 3/4 <b>25</b> = G 1, DN 25 <b>32</b> = G 1 1/4 <b>40</b> = G 1 1/2, DN 40 <b>50</b> = DN 50	<b>MAK</b> = remote sensor with 1,5 m cable connec- tion  <b>MAS</b> = remote sensor with connector  <b>MAG</b> = remote sensor with connector and mating connector	<b>0</b> = 230 V <sub>AC</sub> <b>1</b> = 110 V <sub>AC</sub> <b>2</b> = 24 V <sub>AC</sub> <b>3</b> = 24 V <sub>DC</sub>	<b>0</b> = 0 - 20 mA <b>4</b> = 4 - 20 mA <b>1</b> = 0 - 10 V
0.20 - 1.40	<b>DF-14...</b>						
0.20 - 2.50	<b>DF-25...</b>						
0.30 - 2.60	<b>DF-26...</b>						
0.40 - 5.00	<b>DF-50...</b>						
0.25 - 6.00	<b>DF-06...</b>						
0.50 - 6.00	<b>DF-12...</b>						
1.00 - 12.5	<b>DF-13...</b>						
1.00 - 24.0	<b>DF-24...</b>						
2.00 - 48.0	<b>DF-48...</b>						
2.50 - 60.0	<b>DF-60...</b>						
5.00 - 120	<b>DF-H2...</b>						
40.0 - 160	<b>DF-H6...</b>						



## 13. Dimensions



## 14. Recommended Spare Parts

- 1.1) Rotating vane PTFE
- 1.2) Rotating vane POM
- 1.3) Rotating vane PTFE with sapphire bearings
- 2.1) Stainless Steel axle / PTFE bearings
- 2.2) Ceramic axle / PTFE bearings
- 2.3) Sapphire axle with sapphire bearings (only for rotating vane 1.3)
- 3.1.) Cover for instrument housing, Trogamide, including seal
- 3.2.) Cover for instrument housing, Polysulphone, including seal
- 4.1.) Transparent cover for electronics housing
- 5.1) Set of NBR O-rings
- 5.2) Set of FPM O-rings

For spare part ordering we need the serial no. of the instrument.

## 15. EU Declaration of Conformance

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

### Flow Monitor / Transmitter: DF-MA

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 61010-1:2010

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

#### 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
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS (category 9)

for DF-xxHR32../DF-xxHR40, Edelstahl, 1 1/4"

2014/68/EU

PED

- Category III (IV) Diagram 1, vessel, group 1 dangerous fluids
- Module D, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD0000002

Hofheim, 11. Jan. 2018



H. Peters  
General Manager



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