

# Operating Instruction for Flowmonitor

**Model: DF-WM**



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## 2. Note

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.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 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.

	Pipe	
	Table 8 Group 1 dangerous fluids	Table 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

## 3. Instrument Inspection

The instruments are inspected before shipping and sent out in perfect condition. Should damage to the instrument be visible, we recommend close inspection of the delivery package. In cases of damage, please immediately inform the forwarder as he is liable for any damage in transit.

### **Scope of delivery:**

- All parts belong to the standard scope of supply are attached to the instrument.
- For instruments with socket connection the mating plug is also supplied.

## 4. Regulation Use

The model DF-WM is intended to monitor and measure discrete flow of liquids.

The instrument provides the following facilities:

### Discrete flow measurement

By means of a button and a setpoint selector the actual flowrate can be called up (see flow throughput measuring).

### Limit value relays

The instrument is provided with limit value relays for monitoring flow throughput.

It is suitable for low viscosity fluids providing they have no effects on the instrument's materials. 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

Material Combination	Standard				High Pressure Design	
	I B	II	III	IV	VI <sup>1)</sup>	VII <sup>1)</sup>
Order Code	P	B	D	E	G <sup>1)</sup>	H <sup>1)</sup>
Connecting type	Female thread	Female thread	Female thread	Female thread	Female thread	Female thread
Housing	Polysulfone	Polysulfone	Brass, Nickel-plated	316L SS	Brass, Nickel-plated	316L SS
Housing lid	Polysulfone	Polysulfone	Polysulfone	Polysulfone	Brass, Nickel-plated	316L SS
Connection	Brass, Nickel-plated	316-Ti SS	Brass, Nickel-plated	316-Ti SS	Brass, Nickel-plated	316-Ti SS
Locking pins	Brass <sup>3)</sup>	Brass <sup>3)</sup>	Brass <sup>3)</sup>	-	-	-
O-rings	NBR	FKM	NBR	FKM	NBR	FKM
Paddle wheel	POM	PTFE	POM	PTFE	POM	PTFE
Axle	316L SS	316L SS	316L SS	316L SS	316L SS	316L SS
Axle bushing	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Orifice	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 [PSI]	145	145	230	230	1450	1450
Max. operating temperature [°F]	180	180	180	180	180	180

<sup>1)</sup> Fittings are not rotatable <sup>2)</sup> For Model DF..01 Stainless Steel Orifice <sup>3)</sup> Non-wetted

## 5. Operating Principle

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 on the instrument housing. The electronics mounted on the housing converts the frequency signal and activates a limit switch.

## 6. Mechanical Connection

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### Before installation

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

Type : DF-WM		
DN $\frac{3}{8}$ "	PN 16 bar	12 l/min H <sub>2</sub> O
		IP 65



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

- Please be certain the 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.



Right!

Wrong!



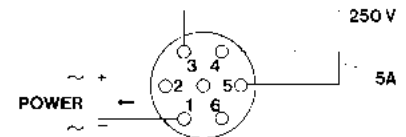
**Warning! The threaded connections of the instrument must be tightened with a suitable sized open-ended spanner. Otherwise, the housing may be stressed which could lead to breakage of the equipment.**

## 7. Electrical Connection



**Warning! Make sure that the supply voltage to your 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.3:

No.4:

No.5:

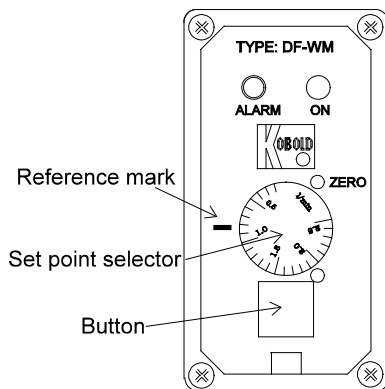


**Warning! Incorrect wiring of the connection in the coupling plug or incorrect wiring of the connection cable can lead to the electronics being destroyed.**

- 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. Commissioning

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The instrument is delivered ready to operate. The electronics are matched and calibrated with the signal transmitter. The calibration screws ('ZERO' and 'RANGE') next to the rotating scale adjustment knob 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. The red 'ALARM' light diode will flash.



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**Warning! A red, flashing LED indicates that the limit value relay is in alarm condition (see connection diagram).**

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### Limit value

The model DF-WM instrument has a limit value relay for monitoring the flow throughput. The switch condition of the relay is indicated by the flashing, red LED. The contact is designed as a minimum contact; i. e. for flow less than the selected flow value the limit value relay will indicate an alarm condition (flashing, red LED).



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**Warning! The limit value relay will indicate an alarm condition if the supply cable is broken or if power supply is interrupted.**

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### Adjustment of limit value

Loosen the four screws on the front plate of the electronics and remove the transparent cover.

The limit value may be adjusted by means of the set point selector.

The required limit value may be set by turning the set point selector so that the value aligns with the reference mark to the left of the scale on the front plate of the electronics.

### Call-up of actual flowrate

To measure the actual flowrate the red button must be depressed. The limit value relay is then bridged and made inoperative. By rotating the set point selector (while holding the button) from the lowest to the highest value (until the red light flashes) the flow rate may be determined from the scale or the set point selector. After reading off the flow rate the set point selector may be repositioned to the desired limit value and the red button released.



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**Warning! After adjustment of the switch or call up of the flow throughput the front plate must be screwed down tight onto the electronics housing. Ensure correct positioning of the gasket.**

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## 9. Commissioning of the Instrument

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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 can lead to measuring errors or destruction of the bearings.**

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## 10. Maintenance

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For measured media without contamination, the DF-WM 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 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 easily be reassembled. Any work on the electronics may only be undertaken by the supplier, otherwise the warranty will become invalid.

## 11. Technical Information

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Power input:	3.5 W max.
Power supply:	24 VDC +15% / -10% 24, 110, 230 VAC $\pm$ 20%
Output:	Changeover contact 250 V max. / 5 A Contact resistance = 100 m.
Protection type	IP 65, all-insulated
Ambient temperature	- 25 °C to + 80 °C
Accuracy	$\pm$ 2.5 % f. s



# DF-WM

## 12. Order Codes

### Order Details (Example: DF-8308BP03)

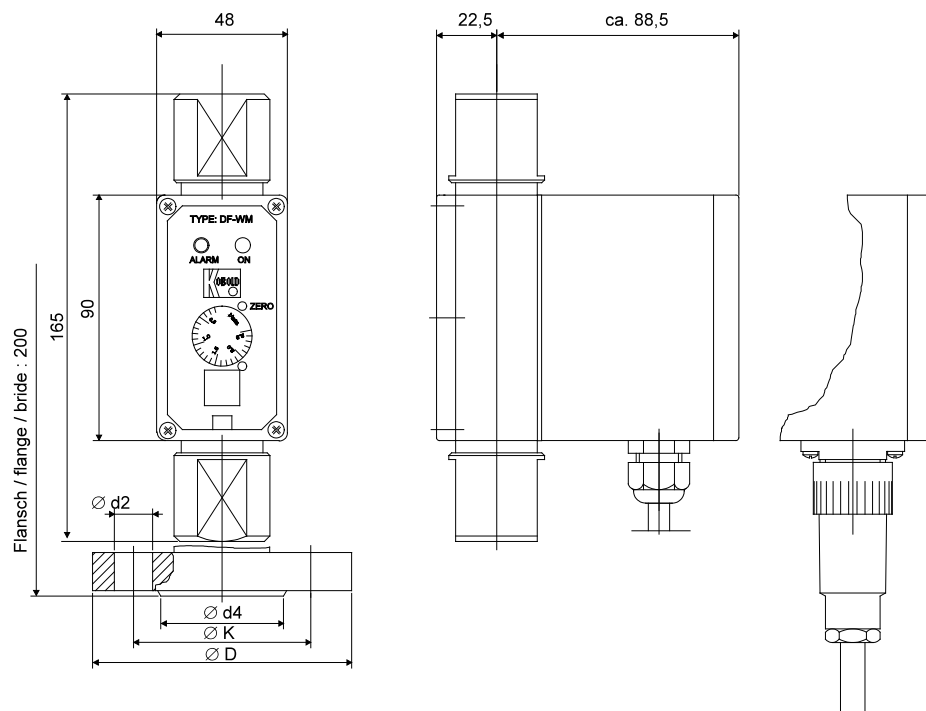
Range (Water) (GPM)	Standard Connection (NPT)	Diameter of Orifice (Inch)	Pressure-Drop Max. (PSI)	DF-WM Material Combination						Options (Add Suffix to Order Number)		
				I B	II	III	IV	VI	VII	Suffix "..B.." Special Conn. (NPT)	Suffix "..L.." Special Range GPH (Water)	Suffix "..P.."
0.02...0.14	1/8"	0.04	10.2	DF-8901..	DF-8201..	DF-8301..	DF-8401..	DF-8601..	DF-8701..	1/4"	1...7	Power Conn. with Plug
0.05...0.30	1/4"	0.08	4.2	DF-8902..	DF-8202..	DF-8302..	DF-8402..	DF-8602..	DF-8702..	3/8"	3...25	
0.05...0.60	1/4"	0.08	10.4	DF-8903..	DF-8203..	DF-8303..	DF-8403..	DF-8603..	DF-8703..	3/8"	3...36	
0.1...0.7	1/4"	0.11	9.6	DF-8904..	DF-8204..	DF-8304..	DF-8404..	DF-8604..	DF-8704..	3/8"	6...42	
0.2...2.5	3/8"	0.19	6.0	DF-8905..	DF-8205..	DF-8305..	DF-8405..	DF-8605..	DF-8705..	1/2"	12...150	
0.4...5	1/2"	0.32	2.9	DF-8906..	DF-8206..	DF-8306..	DF-8406..	DF-8606..	DF-8706..	3/4"	-	
0.5...6	3/4"	0.32	4.4	DF-8907..	DF-8207..	DF-8307..	DF-8407..	DF-8607..	DF-8707..	1"	-	
0.5...12	3/4"	0.49	4.4	DF-8908..	DF-8208..	DF-8308..	DF-8408..	DF-8608..	DF-8708..	1"	-	
1...25	1-1/4"	0.59	15.9	DF-8909..	DF-8209..	DF-8309..	DF-8409..	DF-8609..	DF-8709..	1-1/2"	-	
1.5...36	1-1/4"	0.73	20.0	DF-8910..	DF-8210..	DF-8310..	DF-8410..	DF-8610..	DF-8710..	1-1/2"	-	

Plug Connector with Plug Options	
Description	Add Suffix to Model Number
Power Supply 24 VDC	..P01
Power Supply 24 VAC	..P02
Power Supply 110 VAC	..P03
Power Supply 230 VAC	..P04

Note: To place an order

1. Select the sensor order no.
2. Select the desired option suffixes
3. Specify the required power supply suffix

## 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.

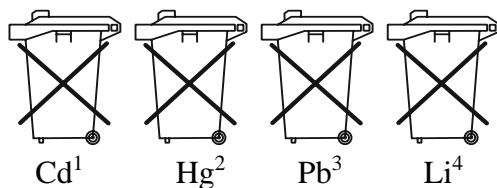
## 15. Disposal

### 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



## 16. EU Declaration of Conformance

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

**Flowmonitor Model: DF-WM**

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

**EN 61000-6-2:2006**

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

**EN 61010-1:2011**

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

**EN IEC 63000:2018** 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:

<b>2014/30/EU</b>	<b>EMC Directive</b>
<b>2014/35/EU</b>	<b>Low Voltage Directive</b>
<b>2011/65/EU</b>	<b>RoHS (category 9)</b>
<b>2015/863/EU</b>	<b>Delegated Directive (RoHS III)</b>

**for DF-xxHR32../DF-xxHR40, stainless steel, 1 1/4"**

**2014/68/EU**

**PED**

- Category II, piping, Diagram 8, group 1 dangerous fluids
- Module D1, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD1000000B

Hofheim, 15 Dec. 2021



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