



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 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

	Standard version				High-pressure version	
Material combination	I	II	III	IV ¹⁾	VI ¹⁾	VII ¹⁾
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 ⁴⁾	Brass nickel-plated	St.steel ⁴⁾
Cover	Trogamide	Polysulfone	Polysulfone	Polysulfone	Brass nickel-plated	St.steel ⁴⁾
Connection	Brass nickel-plated	St.steel ⁴⁾	Brass nickel-plated	St.steel ⁴⁾	Brass nickel-plated	St.steel ⁴⁾
Locking pins	Brass	Brass	Brass	-	-	-
O-rings	NBR	FPM	NBR	FPM	NBR	FPM
Vane	POM	PTFE	POM	PTFE	POM	PTFE
Axle ³⁾	St.steel ⁴⁾	St.steel ⁴⁾	St.steel ⁴⁾	St.steel ⁴⁾	St.steel ⁴⁾	St.steel ⁴⁾
Bearing ³⁾	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Screen	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾
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 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

Before installation

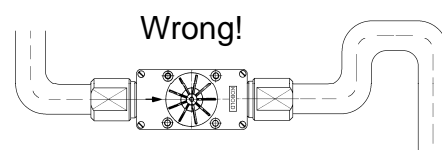
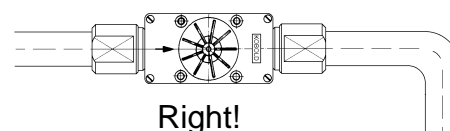
Please be sure the actual flow throughput matches the flow range of the instrument. The flow range may be obtained from the label.

Type : DF-WM		
		12
DN $\frac{3}{8}$ "	PN 16 bar	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.





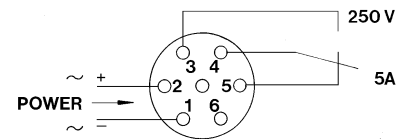
Warning! The threaded connections of the instrument must be tightened with a suitable sized open ended spanner. Otherwise, the housing may be stressed which could lead to breakage of the equipment.




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 mm².



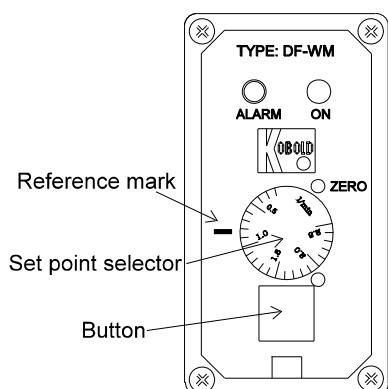
Cable connection:
No.1 : Power supply (-)
No.2 : Power supply (+)
No.3: 
No.4: 
No.5: 



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



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.



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

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).



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

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.



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.

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

10. Maintenance

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.

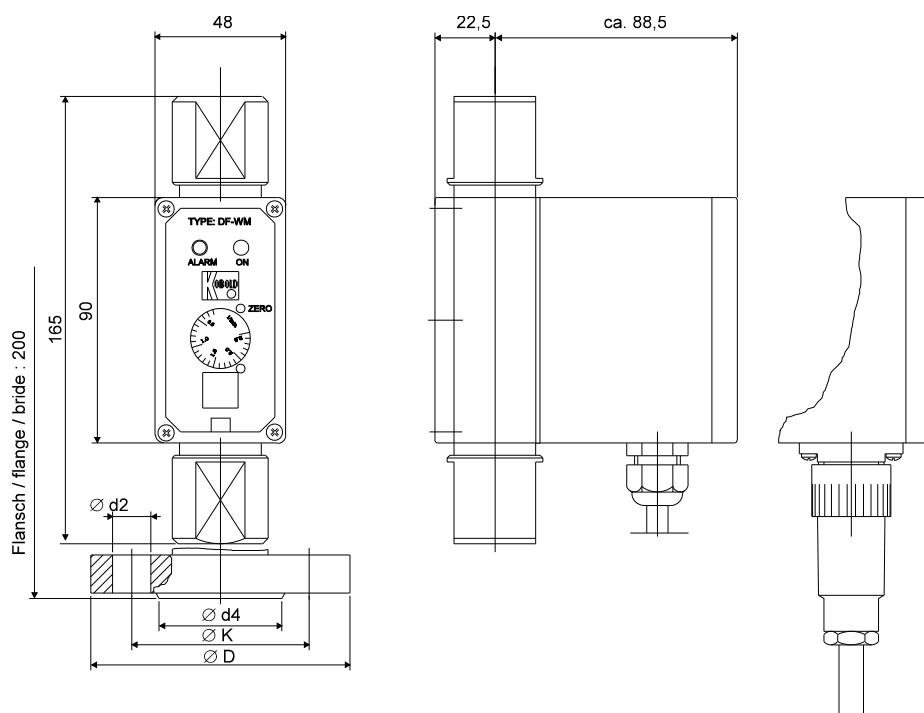
11. Technical Information

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

12. Order Codes

Flow rate L/min	Model	Material combination (see trans- ducer)	Connection*	Connection sizes (see measuring sen- sor for recommended size)	Electronics	Auxiliary power
0.08 – 0.50	DF-05...	A = Trogamide/ brass B = PSO/ VA D = Brass E = St. St. G = Brass, 100 bar H = St. St., 100 bar	R = G female N = NPT female F = Flange DIN 2527, PN 40	06 = G 1/8 08 = G 1/4 10 = G 3/8 15 = G 1/2, DN 15 20 = G 3/4 25 = G 1, DN 25 32 = G 1 1/4 40 = G 1 1/2, DN 40 50 = DN 50	WMK = monitor with 1.5 m cable connection WMS = monitor with connector WMG = monitor with connector and mating connector	0 = 230 V _{AC} 1 = 110 V _{AC} 2 = 24 V _{AC} 3 = 24 V _{DC}
0.20 – 1.40	DF-14...					
0.20 – 2.50	DF-25...					
0.30 – 2.60	DF-26...					
0.40 – 5.00	DF-50...					
0.25 – 6.00	DF-06...					
0.50 – 12.0	DF-12...					
1.00 – 12.5	DF-13...					
1.00 – 24.0	DF-24...					
2.00 – 48.0	DF-48...					
2.50 – 60.0	DF-60...					
5.00 – 120	DF-H2...					
40.0 – 160	DF-H6...					

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

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 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


for **DF-xxHR32../DF-xxHR40, stainless steel, 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


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