Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

# Vane Flowmeter, Monitor, Counter, Batching System

in modular design · for liquids

measuring
•
monitoring
•
analysing

## DF

- Measuring ranges: 0.08 - 0.50 ... 40 - 160 l/min water
- Measuring accuracy: ±2.5% of full scale
- $p_{max}$: 100 bar; $t_{max}$: 80 °C
- Viscosity range: low viscosity
- Connection: G ⅛ ... G 1½, flange DN 15 ... DN 50
- Materials: 6 different material combinations
- Output: 0(4)-20 mA, 0-10 V, switch contacts, batch, metering

S4


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## Description

The established vane technology has proven itself a million times worldwide for measuring and monitoring the flow of different mediums in pipelines. Flowmeters/monitors work with this proven principle and offer many benefits. The heart of the new vane is an embedded ring magnet; it is hermetically sealed from the flow medium. It transfers, in a non-contacting manner, the rotary motion of the vane to a Hall sensor attached to the case (in order to save space). This converts the rotary motion to a frequency signal that is proportional to the flow rate. The downstream evaluating electronics can output this signal to a display, convert it to (0(4)-20 mA, 0-10 V) analogue signal, or count it. It may also be used to switch with up to two limit contacts. The ready and control states of the limit value relay are indicated by LEDs. The modular design of flow monitors and measuring instruments is a system that can be universally applied; it is reasonably priced; and requires minimum space when in service. Very precise measurement results can be achieved, under tough operating conditions along with the electronics. The system is assembled with the electronics and delivered ready for service. The electronics are adjusted and tuned for use with the sensor. When retrofitted for other measuring ranges, the system may be re-adjusted with a similar device at any time.

## Measuring Sensor

Connection:
Pipe thread G ⅛ ... G 1½
Measuring ranges:
0.08 - 0.5 ... 40 - 160 l/min
Measuring accuracy:
±2.5% f.s.
Eight different material combinations

Connection:
Flange DIN 2501,
DN 15, DN 25, DN 40, DN 50
Measuring ranges:
0.08 - 0.5 ... 40 - 160 l/min
Measuring accuracy:
±2.5% f.s.
Two different material combinations

## Evaluating Electronics

| | | | | |
|---|---|---|---|---|
| | | | | |
| **DF-... WM**<br>• intermittent measuring and continuous monitoring<br>• 1 limit value relay<br>• pushbutton and scale potentiometer for sensing the flow rate | **DF-...MA**<br>• for teletransmitting the flow rate<br>• output 0(4)-20 mA 0-10 $V_{DC}$ | **DF-...KL**<br>• continuous measuring and monitoring<br>• digital display<br>• 2 limit value relays<br>• output 0(4)-20 mA 0-10 $V_{DC}$ | **DF-...-Z**<br>• measuring and metering<br>• LED display<br>• output 0(4)-20 mA 0-10 $V_{DC}$<br>• 2 adding meters<br>• 2 relays freely programmable | **DF-...-D**<br>• measuring, counting and batching<br>• LED display<br>• output 0(4)-20 mA 0-10 $V_{DC}$<br>• subtracting and adding meter<br>• 1 dosing relay<br>• 1 relay freely programmable |


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## Description

Measuring sensors are available with pipe thread or flange connections; standard or high-pressure versions are optional. The standard version is delivered with a standard front cover from solid, transparent plastic, which allows the flow to be optically inspected. The rotary motion of the shining red vane can be clearly seen. Faults such as power failure or rotor blockage can thus be quickly detected in situ. In addition to their use as measuring and monitoring systems, the devices can also be used as flow indicators. The standard front cover is replaced by a metal plate on the high-pressure version (up to 100 bar with the threaded version).

The devices can be installed in any position. However, the flow must always be in the direction of the arrow, and the front panel of the device must be arranged in the vertical plane.

The fluidic housing must be full with liquid. Additional inlet or outlet pipes are not required. The large radial clearance between vane and housing wall renders the measuring sensor insensitive to dirt. Depending on the version, the connection fittings can be rotated and are bearing mounted. Switching electronics or vane front may be rotated at will for ease of viewing (while in service).

**Model DF...H**: DF-flow sensors are also available without a compact electronic. The linear flow proportional pulse signal provided by the sensor can be controlled by customer own electronics.

## Measuring Ranges

| Model | Flow rate [l/min] | Δp [bar] at max. flow rate | Filter [mm] | Recommended connection sizes | |
|---|---|---|---|---|---|
| | | | | Internal thread ["] | Flange DN |
| **DF-05..** | 0.08 - 0.50 | 0.76 | 1.0 | ¼, (⅛)* | 15 |
| **DF-14..** | 0.20 - 1.40 | 0.36 | 2.0 | ¼, ⅜ | 15 |
| **DF-25..** | 0.20 - 2.50 | 0.94 | 2.0 | ¼, ⅜ | 15 |
| **DF-26..** | 0.30 - 2.60 | 0.98 | 2.0 | ¼, ⅜ | 15 |
| **DF-50..** | 0.40 - 5.00 | 0.45 | 3.5 | ¼, ⅜, ½ | 15 |
| **DF-06..** | 0.25 - 6.00 | 1.00 | 3.2 | ¼, ⅜, ½ | 15 |
| **DF-12..** | 0.50 - 12.00 | 0.61 | 5.0 | ¼, ⅜, ½ | 15, 25 |
| **DF-13..** | 1.00 - 12.50 | 0.14 | 8.0 | ½, ¾, 1 | 15, 25 |
| **DF-24..** | 1.00 - 24.00 | 0.36 | 8.0 | ½, ¾, 1 | 15, 25 |
| **DF-48..** | 2.00 - 48.00 | 0.43 | 12.5 | ¾, 1 | 25 |
| **DF-60..** | 2.50 - 60.00 | 0.63 | 12.5 | ¾, 1 | 25, 40 |
| **DF-H2..** | 5.00 - 120.00 | 1.20 | 18.5 | 1, 1¼, 1½ | 25, 40, 50 |
| **DF-H6..** | 40.0 - 160.00 | 1.50 | 18.5 | 1, 1¼, 1½ | 25, 40, 50 |

* Upon request



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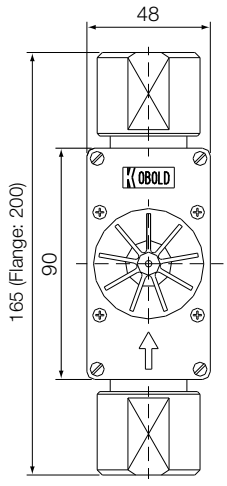
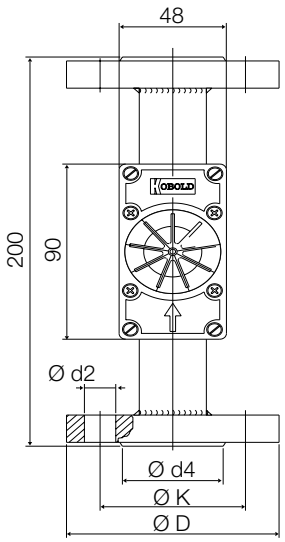
## Material Combinations

| | 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 steel for model DF 0.5
[3] Special version upon request
[4] Stainless steel 1.4571, 1.4404

## **Dimensions** [mm]




### Flange DIN 2527 PN40

| DN | PN | D [mm] | K [mm] | d4 [mm] | d2 [mm] |
|---|---|---|---|---|---|
| 15 | 40 | 95 | 65 | 45 | 14 |
| 25 | 40 | 115 | 85 | 68 | 14 |
| 40 | 40 | 150 | 110 | 88 | 18 |
| 50 | 40 | 165 | 125 | 102 | 18 |

DIN 2526 sealing face form C



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## Flow Indicator with Intermittent Sensing

The DF-...WM evaluating electronics is used in applications where sporadic flow rate measurement is required, or where simultaneous continuous monitoring is needed. It converts the digital frequency signal from the sensor to a limit contact.

The limit value over the entire measuring range can be set with a potentiometer with calibrated scale. The ready state is indicated by a green LED. When the flow rate drops below the setpoint, a red LED flashes. The relay can be shorted and disabled by pressing a button. The flow rate can be determined and the potentiometer scale can be read by rotating the potentiometer from the largest to the smallest value (until the red diode flashes).

The front panel on the electronics and vane are displaced by 180°. This means that the operator can see from two directions whether flow is available.

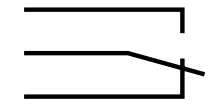
The power supply of the device and the relay output are connected with a 7-pin connector or a 1.5 m cable. (A cable can only be used for flange connection.)

## Technical Details

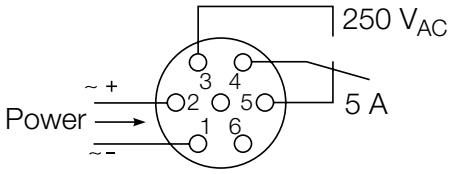
| | |
|---|---|
| Accuracy: | ±2.5% f. s. |
| Power supply: | 24 $V_{DC}$ +15% / -10%<br>24, 110, 230 $V_{AC}$ ±20% |
| Power input: | 3.5 W max. |
| Output: | changeover contact max. 250 V/5 A<br>contact resistance ≤100 mΩ |
| Ambient temperature: | -25 °C ... +80 °C |
| Protection type: | IP 65, all-insulated |

## Cable Connections

No.1 supply voltage (–)
No.2 supply voltage (+)
No.3
No.4
No.5



## Wiring Diagram




In the no-load or alarm state

**Order Details** (Example: **DF-05 A R 06 WMK 0**)

| Flow rate [l/min] | Model | Material combination (see transducer) | Connection | Connection sizes (see measuring sensor for recommended size) | Electronics | Auxiliary power |
|---|---|---|---|---|---|---|
| 0.08-0.50 | **DF-05...** | **A** = Trogamide/Brass<br>**B** = PSO/VA<br>**D** = Brass<br>**E** = St. steel<br>**G** = Brass, 100 bar<br>**H** = St. steel, 100 bar | **R** = G female<br>**N** = NPT female<br>**F** = flange DIN 2527, PN 40 | **06** = G ⅛<br>**08** = G ¼<br>**10** = G ⅜<br>**15** = G ½, DN 15<br>**20** = G ¾<br>**25** = G 1, DN 25<br>**32** = G 1¼<br>**40** = G 1½, DN 40<br>**50** = DN 50 | **WMK** = monitor with 1.5 m cable connection<br>**WMS** = monitor with connector<br>**WMG** = monitor with connector and mating plug | **0** = 230 $V_{AC}$<br>**1** = 110 $V_{AC}$<br>**2** = 24 $V_{AC}$<br>**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...** | | | | | |



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## Remote Flow Transmitter

The DF-...MA evaluating electronics converts the frequency signal from the measuring sensor to a 0(4)-20 mA, 0-10 $V_{DC}$ analogue signal. It is ideally suited for precise teletransmission of flow-rate measurements for indicating devices, recorders or controllers, for example.

A green LED on the transmitter indicates the ready state. If the sensor is replaced, the transmitter should be readjusted with the potentiometers marked 0 mA and/or 20 mA. They are protected against unintentional rotation by a foil situated behind the front dial. Measuring accuracy and perfect operation is only guaranteed when the foil is undamaged. The supply voltage and output are connected with a 7-pin circular connector or a 1.5 m cable. (A cable can only be used for flange connection.)

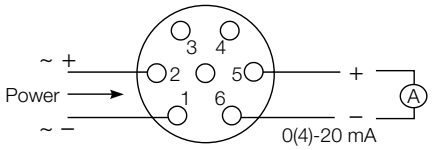
## Technical Details

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

## Cable Connections

No. 1 supply voltage (–)
No. 2 supply voltage (+)
No. 5 analog output (+)
No. 5 analog output (-)

## Wiring Diagram




## Order Details (Example: **DF-05 A R 06 MAK 0 0**)

| Flow rate [l/min] | Typ | Material combination (see transducer) | Connection | Connection sizes (see measuring sensor for recommended size) | Electronics | Auxiliary power | Analogue output |
|---|---|---|---|---|---|---|---|
| 0,08-0,50 | **DF-05...** | | | | | | |
| 0,20-1,40 | **DF-14...** | | | | | | |
| 0,20-2,50 | **DF-25...** | **A** = Trogamide/ Brass | | **06** = G ⅛ | **MAK** = remote sensor with 1.5 m cable connection | | |
| 0,30-2,60 | **DF-26...** | | | **08** = G ¼ | | | |
| 0,40-5,00 | **DF-50...** | **B** = PSO/VA | **R** = G female | **10** = G ⅜ | | | |
| 0,25-6,00 | **DF-06...** | **D** = Brass | **N** = NPT female | **15** = G ½, DN 15 | **MAS** = remote sensor with connector | **0** = 230 $V_{AC}$ | **0** = 0-20 mA |
| 0,50-12,0 | **DF-12...** | **E** = St. steel | **F** = flange DIN 2527, PN 40 | **20** = G ¾ | | **1** = 110 $V_{AC}$ | **4** = 4-20 mA |
| 1,00-12,5 | **DF-13...** | **G** = Brass, 100 bar | | **25** = G 1, DN 25 | **MAG** = remote sensor with connector and mating connector | **2** = 24 $V_{AC}$ | **1** = 0-10 V |
| 1,00-24,0 | **DF-24...** | | | **32** = G 1¼ | | **3** = 24 $V_{DC}$ | |
| 2,00-48,0 | **DF-48...** | **H** = St. steel, 100 bar | | **40** = G 1½, DN 40 | | | |
| 2,50-60,0 | **DF-60...** | | | **50** = DN 50 | | | |
| 5,00-120 | **DF-H2...** | | | | | | |
| 40,0-160 | **DF-H6...** | | | | | | |



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## Flow Indicator with Digital Display, Min./Max. Contact and Analogue Output

The DF-K evaluating electronics outputs the sensor frequency signal to a display, and converts it to an analogue signal and two limit contacts. The top display line of the double-spaced display shows the flow value with measuring unit and the bottom line a bargraph indicator proportional to the measuring value. The two relays with floating output change over contacts continuously monitor the flow values. Switching point, hysteresis, a window point, and switch on or off delay can be set separately for each relay. The switching points can also be set directly by using the control keys without having to change over into the menu. A red LED indicates with the switching status.

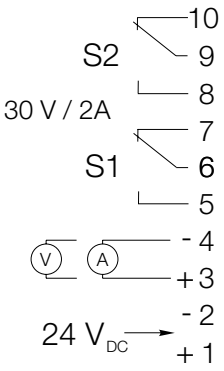
The analogue output is optionally available as current output with 0(4)...20 mA or as voltage output with 0...10 V. A Min./Max. reading memory determines the extreme readings of the flow. If the maximum set flow (exceeded range) is exceeded, it will be shown on the display. The set parameters can be protected against unauthorised alteration by using a password function.

The device is connected with a 10-wire cable.

## Technical Details

| | |
|---|---|
| Accuracy: | ±2.5% f.s. |
| Display: | double-spaced display, illuminated flow value with selectable units and bargraph display |
| Power supply: | 24 $V_{DC}$ ±20% |
| Current consumption: | approx. 100 mA |
| Electrical connection: | 10-wire cable connection |
| Analogue output: | (0)4...20 mA selectable<br>Load: 0...500 Ω or 0-10 $V_{DC}$,<br>Load: >100 kΩ |
| Switching output: | 2 relays, max. 30 V/2 A |
| Control elements: | via 3 keys |
| Functions: | Min./Max. memory, flow monitor, language settings, password protection |
| Protection type: | IP 65 |

## Electrical Connection




**Order Details** (Example: **DF-05 A R 06 KLK3 4**)

| Flow rate [l/min] | Model | Material combination (see transducer) | Connection | Connection sizes (see measuring sensor for recommended size) | Electronics | Analogue output |
|---|---|---|---|---|---|---|
| 0.08-0.50 | **DF-05...** | **A** = Trogamide/Brass<br>**B** = PSO/VA<br>**D** = Brass<br>**E** = St. steel<br>**G** = Brass, 100 bar<br>**H** = St. steel, 100 bar | **R** = G female<br>**N** = NPT female<br>**F** = flange DIN 2527, PN 40 | **06** = G ⅛<br>**08** = G ¼<br>**10** = G ⅜<br>**15** = G ½, DN 15<br>**20** = G ¾<br>**25** = G 1, DN 25<br>**32** = G 1¼<br>**40** = G 1½, DN 40<br>**50** = DN 50 | **KLK3** = digital display, switching and analogue output, 24 $V_{DC}$ with 1.5 m cable connection<br>**KLL3** = digital display, switching and analogue output, 24 $V_{DC}$ cable connection (Please specify length in clear text) | **4** = (0)4-20 mA<br>**1** = 0-10 V |
| 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...** | | | | | |

### Flow Indicator with Digital Display and Counter Electronic

The evaluation unit changes the frequency signal of the pickup into a 3(4)-digit flow reading with selectable measurement unit (top display line), and into a scalable analogue signal. The flow quantity is added up in a part quantity meter and a total quantity meter and then displayed in the bottom line of the screen. The quantity meter's units of measurement are selectable.

The two relays with floating output changeover contacts continuously monitor if the freely adjustable limits are exceeded or fallen short of. Here, it is possible to choose between threshold value and window monitoring.

Switching point, hysteresis, a window point, and switch on or off delay can be set separately for each relay. The switching points can also be set directly by using the control keys without having to change over into the menu. Alternatively, it is also possible to monitor the quantity meter to see if it is exceeded. A red LED indicates with the switching status.

The analogue output is optionally available as current output with 0(4)...20 mA or as voltage output with 0...10 V. The parameter names can be shown in the menu in German or English. If used where the flow readings change rapidly, the display can be pacified and the analogue reading averaged by switching on some software.

A Min./Max. reading memory determines the extreme readings of the flow. The display of the readings and the resetting are achieved by using the keys without having to change into the menu. Resetting by using the keys can also be blocked. If the maximum set flow (exceeded range) is exceeded, it will be shown on the display. The set parameters can be protected against unauthorised alteration by using a password function.

### Range of Functions

Quantity meter and flowmeter with digital display, switch and analogue output:

- Measurement and display total, part and flow quantities
- Control input for part quantity reset
- 2 switching outputs,
  freely programmable as flow monitor or for monitoring the part and total quantity
- Analogue output 0(4)-20 mA or 0-10 V
- Min./Max. memory

### Technical Details

| | |
|---|---|
| Accuracy: | ±2.5% f.s. |
| Display: | 2 x 8-digit LCD module, illuminated total, part and flow quantity, units of measurement are selectable |
| Quantity meter: | 8 digits |
| Power supply: | 24 $V_{DC}$ ±20%, |
| Current consumption: | approx. 100 mA |
| Electrical connection: | 10-wire cable connection |
| Analogue output: | 0(4)...20 mA selectable<br>Load: 0...500 Ω<br>or<br>0...10 $V_{DC}$, Load: >100 kΩ |
| Switching output: | 2 relays,<br>max. 30 V/2 A |
| Control elements: | via 4 keys |
| Functions: | reset function, Min./Max.-memory, flow monitor, monitoring of part and total quantities, language |
| Protection type: | IP 65 |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## Flow Indicator with Digital Display and Counter Electronic Model DF-...ZLxxx

**Order Details** (Example: **DF-05 A R 06 ZLK3 4**)

| Flow rate [l/min] | Model | Material combination (see transducer) | Connection | Connection sizes (see measuring sensor for recommended size) | Electronics | Analogue output |
|---|---|---|---|---|---|---|
| 0.08-0.50<br>0.20-1.40<br>0.20-2.50<br>0.30-2.60<br>0.40-5.00<br>0.25-6.00<br>0.50-12.0<br>1.00-12.5<br>1.00-24.0<br>2.00-48.0<br>2.50-60.0<br>5.00-120<br>40.0-160 | **DF-05...**<br>**DF-14...**<br>**DF-25...**<br>**DF-26...**<br>**DF-50...**<br>**DF-06...**<br>**DF-12...**<br>**DF-13...**<br>**DF-24...**<br>**DF-48...**<br>**DF-60...**<br>**DF-H2...**<br>**DF-H6...** | **A** = Trogamide/Brass<br>**B** = PSO/VA<br>**D** = Brass<br>**E** = St. steel<br>**G** = Brass, 100 bar<br>**H** = St. steel, 100 bar | **R** = G female<br>**N** = NPT female<br>**F** = flange DIN 2527, PN 40 | **06** = G ⅛<br>**08** = G ¼<br>**10** = G ⅜<br>**15** = G ½, DN 15<br>**20** = G ¾<br>**25** = G 1, DN 25<br>**32** = G 1¼<br>**40** = G 1½, DN 40<br>**50** = DN 50 | **ZLK3** = counter electronic, 24 $V_{DC}$ 1.5 m cable connection<br>**ZLL3** = counter electronic, 24 $V_{DC}$ cable connection (Please specify length in clear text) | **4** = (0)4-20 mA<br>**1** = 0-10 V |

### Electrical Connection

DF-... ZLxxx cable connection

| Wire number | Function |
|---|---|
| 1 | +24 $V_{DC}$ |
| 2 | GND |
| 3 | Analogue output |
| 4 | GND |
| 5 | don't connect |
| 6 | Reset part quantities |
| 7 | Relay S1 |
| 8 | Relay S1 |
| 9 | Relay S2 |
| 10 | Relay S2 |



No responsibility taken for errors;
subject to change without prior notice.

## Flow Indicator with Digital Display and Dosing Electronic

The evaluation unit changes the frequency signal of the pickup into a 3(4)-digit flow reading with adjustable scale (top line of display), and a scalable analogue signal. The dosage is displayed in the bottom line of the display. The unit of measurement can be selected. Included are two relays with floated output changeover contacts for various functions. The relay (S1) can be used to execute the flow monitoring, total volume monitoring, fine dosage or the pump control.

When the flow is being continuously monitored, it checks if the freely adjustable limits are exceeded or fallen short of. A choice can be made between threshold value and window monitoring. Switching point, hysteresis window point, and switch-on or switch-off delay can be set as desired. If monitoring of the total volume is selected, a check is made to see if the adjustable quantity limit is exceeded. The dosage relay (S2) switches on when the dosage process starts, and then switches off again, once the dosage has flowed through. The dosage process can be interrupted by using the Start/Stop switch. By taking a correction quantity into account, it is possible to take any special features or conditions of the system into account. By entering a fine dosage, the bypass valve can be controlled with the relay (S1). A red LED indicates the relay's switching status.

The Analogue output is available as a current output with 0(4)…20 mA or a voltage output with 0…10 V. The parameter names in the menu can be displayed in either German or English. If used where the flow readings change rapidly, the display can be pacified and the analogue reading averaged by switching on some software. If the maximum set flow (exceeded range) is exceeded, it will be shown on the display. The set parameters can be protected against unauthorised alteration using a password function.

## Range of Functions

Dosage and flowmeter with digital display, switching and analogue output:

- Measurement and display of dosage, total and flow quantities
- Interval counter (number of dosage process)
- 2 control inputs
- 1 Dosage output
- 1 switching output, freely programmable as flow monitor or for monitoring the total quantity
- Analogue output 0(4)-20 mA or 0-10 V

## Technical Details

| | |
|---|---|
| Accuracy: | ±2.5% f.s. |
| Display: | 2 x 8-digit LCD module, illuminated dosage, total and flow quantity, units of measurement are selectable |
| Quantity meter: | 8-digit |
| Dosage: | 5-digit |
| Power supply: | 24 $V_{DC}$ ±20%, |
| Current consumption: | approx. 100 mA |
| Electrical connection: | 10-wire cable connection |
| Analogue output: | 0(4)…20 mA selectable<br>Load: 0…500 Ω<br>or<br>0…10 $V_{DC}$, Load: >100 kΩ |
| Switching output: | 2 relays,<br>max. 30 V/2 A |
| Control elements: | via 4 keys |
| Functions: | dosage (relay S2), start, stop, reset, fine dosage, correction quantity, flow monitor, total volume monitoring, language |
| Protection type: | IP 65 |


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1/01-2017

## Flow Indicator with Digital Display and Dosing Electronic Model DF-...DLxxx

**Order Details** (Example: **DF-05 A R 06 DLK3 4**)

| Flow rate [l/min] | Model | Material combination (see transducer) | Connection | Connection sizes (see measuring sensor for recommended size) | Electronics | Analogue output |
|---|---|---|---|---|---|---|
| 0.08-0.50<br>0.20-1.40<br>0.20-2.50<br>0.30-2.60<br>0.40-5.00<br>0.25-6.00<br>0.50-12.0<br>1.00-12.5<br>1.00-24.0<br>2.00-48.0<br>2.50-60.0<br>5.00-120<br>40.0-160 | **DF-05...**<br>**DF-14...**<br>**DF-25...**<br>**DF-26...**<br>**DF-50...**<br>**DF-06...**<br>**DF-12...**<br>**DF-13...**<br>**DF-24...**<br>**DF-48...**<br>**DF-60...**<br>**DF-H2...**<br>**DF-H6...** | **A** = Trogamide/Brass<br>**B** = PSO/VA<br>**D** = Brass<br>**E** = St. steel<br>**G** = Brass, 100 bar<br>**H** = St. steel, 100 bar | **R** = G female<br>**N** = NPT female<br>**F** = flange DIN 2527, PN 40 | **06** = G ⅛<br>**08** = G ¼<br>**10** = G ⅜<br>**15** = G ½, DN 15<br>**20** = G ¾<br>**25** = G 1, DN 25<br>**32** = G 1¼<br>**40** = G 1½, DN 40<br>**50** = DN 50 | **DLK3** = dosing electronic, 24 $V_{DC}$ 1.5 m cable connection<br>**DLL3** = dosing electronic, 24 $V_{DC}$ cable connection (Please specify length in clear text) | **4** = (0)4-20 mA<br>**1** = 0-10 V |

## Electrical Connection

### DF-... DLxxx cable connection

| Wire number | Function |
|---|---|
| 1 | +24 $V_{DC}$ |
| 2 | GND |
| 3 | Analogue output |
| 4 | GND |
| 5 | Control 1* |
| 6 | Control 2* |
| 7 | Relay S1 |
| 8 | Relay S1 |
| 9 | Relay S2 |
| 10 | Relay S2 |

* Control 1 <-> GND: Start-dosing
Control 2 <-> GND: Stop-dosing
Control 1 <-> Control 2 <-> GND: Reset-dosing



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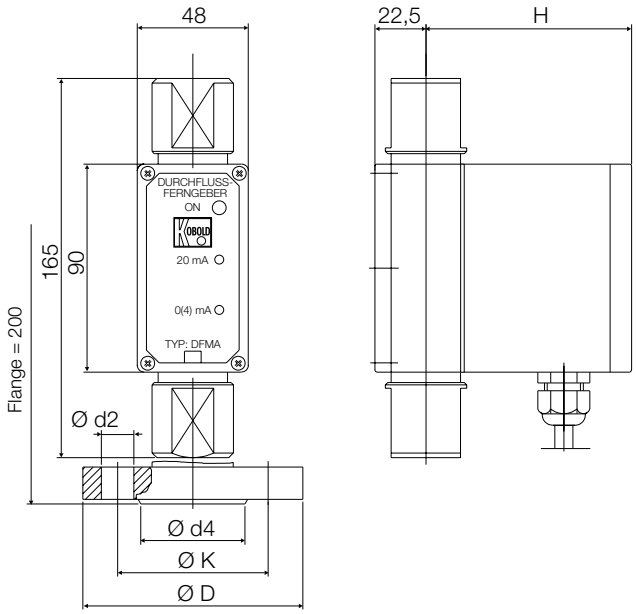
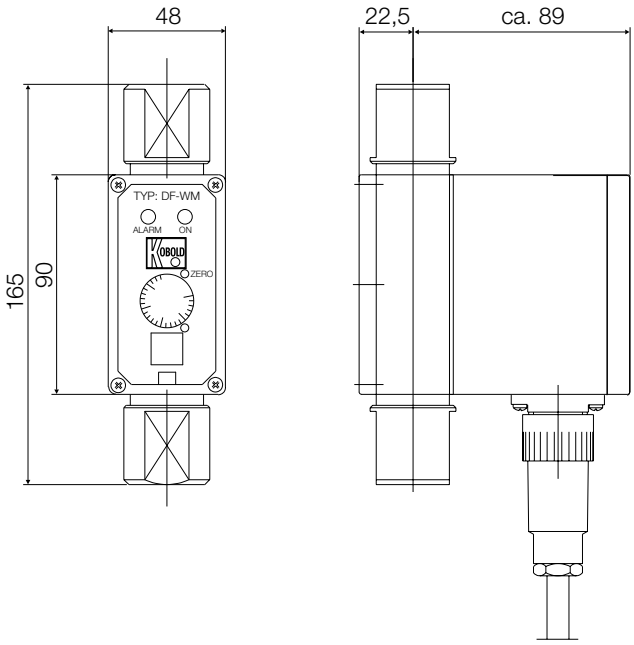
## **Dimensions** [mm]

### Cable connection
**DF-...KL, DF-...WM, DF-...MA, DF-...ZL, DF-...DL**




### Plug connection
**DF-...WM, DF-...MA**




### Flange DIN 2501 PN 40

| DN | D [mm] | K [mm] | d4 [mm] | d2 [mm] | Screw quantity |
|---|---|---|---|---|---|
| 15 | 95 | 65 | 45 | 14 | 4 |
| 25 | 115 | 85 | 68 | 14 | 4 |
| 40 | 150 | 110 | 88 | 18 | 4 |
| 50 | 165 | 125 | 102 | 18 | 4 |

| Model | H |
|---|---|
| DF-...MA, DF-...WM | approx. 89 mm |
| DF-...DLxxx, DF-...ZLxxx, DF-...KL | approx. 93 mm |



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## Description

The measuring sensors are also available without evaluating electronics. The linear flow proportional pulse signal provided by the sensor can be controlled by customer own electronics. For connection there exists a connection box with integrated connection pins. With the OEM-version the customer is capable of integrating the sensor directly in his electronic to save additional costs and material (EMV-stability must be realised).

## Technical Details

| | |
|---|---|
| Measuring accuracy: | ±2.5% f.s. |
| Medium temperature: | -20...+80 °C |
| Protection type: | IP 65 |

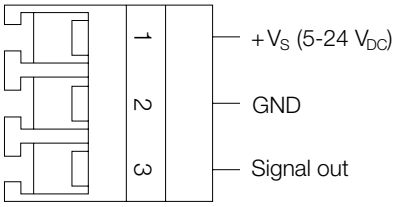
**Frequency Output (OEM) no CE (...IHO, ...IHP)**

| | |
|---|---|
| Power supply: | 5-24 $V_{DC}$ |
| Supply current: | approx. 5 mA |
| Signal amplitude high: | approx. power supply |
| Signal amplitude low: | ≤0.2 V |
| Output loss: | max. 2.5 mW |
| Electrical connection: | approx. 80 mm cable |
| Pulse output: | NPN, open collector, max.15 mA, not symmetric |

**Frequency Output (...HNO, ...HNP, ...HPO, ...HPP)**

| | |
|---|---|
| Power supply: | 5-24 $V_{DC}$ |
| Supply current: | approx. 5 mA |
| Signal amplitude high: | approx. power supply |
| Signal amplitude low: | ≤0.2 V |
| Output loss: | max. 2.5 mW |
| Electrical connection: | PC-connection box with cable connection plug |
| Pulse output: | NPN or PNP, open collector, max. 15 mA, not symmetric |
| Special versions: | High temperature version, DIN-Plug connection |

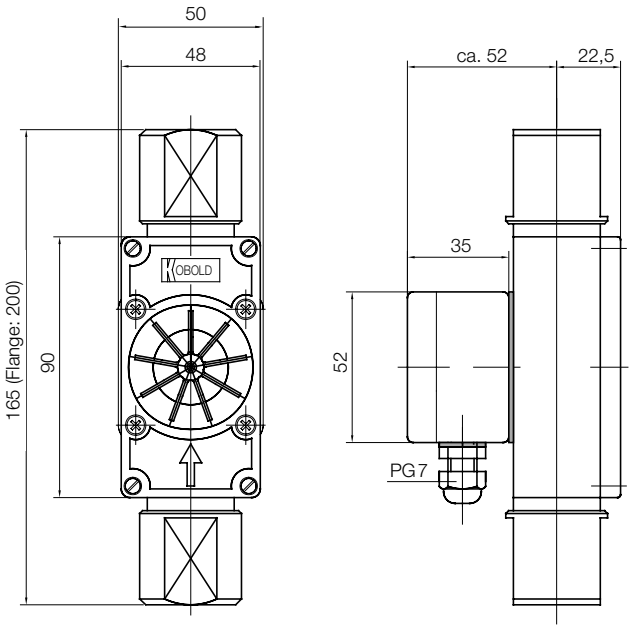
## Electrical Connection




## Cable Connection

red = +$V_S$
blue = GND
yellow = Signal out

## Dimensions [mm]




## Order Details (Example: **DF-05 A R06 IHO 3K**)

| Flow rate [l/min] | Frequency at Qmax [Hz] | Model | Material combination (see transducer) | Connection[1] female or flange DIN 2527, PN40 | Pulse output | Auxiliary power |
|---|---|---|---|---|---|---|
| 0.08-0.50 | ca. 28 | **DF-05...** | **A** = Trogamide/Brass<br>**B** = PSO/VA<br>**D** = Brass<br>**E** = St. steel<br>**G** = Brass, 100 bar<br>**H** = St. steel, 100 bar | **R06** = G ⅛<br>**R08** = G ¼<br>**R10** = G ⅜<br>**R15** = G ½, DN 15<br>**R20** = G ¾<br>**R25** = G 1, DN 25<br>**R32** = G 1¼<br>**R40** = G 1½, DN 40<br>**F15** = DN15[2]<br>**F25** = DN25[2]<br>**F40** = DN40[2]<br>**F50** = DN 50[2] | **IHO** = approx. 80 mm cable, NPN, OEM, without calibration certificate<br>**IHP** = approx. 80 mm cable, NPN, OEM, with calibration certificate<br>**HNO** = PC-connection box, NPN without calibration certificate<br>**HNP** = PC-connection box, NPN with calibration certificate<br>**HPO** = PC-connection box, PNP without calibration certificate<br>**HPP** = PC-connection box, PNP with calibration certificate | **3K** = 5...24 $V_{DC}$ |
| 0.20-1.40 | ca. 25 | **DF-14...** | | | | |
| 0.20-2.50 | ca. 50 | **DF-25...** | | | | |
| 0.30-2.60 | ca. 38 | **DF-26...** | | | | |
| 0.40-5.00 | ca. 53 | **DF-50...** | | | | |
| 0.25-6.00 | ca. 85 | **DF-06...** | | | | |
| 0.50-12.0 | ca. 90 | **DF-12...** | | | | |
| 1.00-12.5 | ca. 48 | **DF-13...** | | | | |
| 1.00-24.0 | ca. 93 | **DF-24...** | | | | |
| 2.00-48.0 | ca. 85 | **DF-48...** | | | | |
| 2.50-60.0 | ca. 100 | **DF-60...** | | | | |
| 5.00-120 | ca. 116 | **DF-H2...** | | | | |
| 40.0-160 | ca. 165 | **DF-H6...** | | | | |

[1] Recommended size, please see transducer [2] Flange connection with material combination stainless steel E or H only



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