

# MAGNETIC-INDUCTIVE FLOW METER MID SERIES

## 1. IDENTIFICATION

Manufacturer	Bopp & Reuther Messtechnik Am Neuen Rheinhafen 4 67346 Speyer / Germany Phone : +49 6232 657-0 Fax : +49 6232 657-505
Product type	Magnetic-inductive flow meter
Product name	MID series

## 2. AREA OF APPLICATION

The area of application for all MID magnetic-inductive flow meters includes the measurement of conductive liquids ( $>1\mu\text{S}/\text{cm}$ ) in dosing and filling plants. These plants are mainly used in the food and beverage industry as well as in the pharmaceutical and fine chemicals industry. Among others, milk and dairy products (also with pieces of fruit), ketchup, mayonnaise, mustard, sauces, dressings, cleaning and washing agents, medical products (e.g. stomach gels), sterile

injection products and cosmetics are measured.

These applications require measuring instruments that offer fast and high-precision measurements. This is met by the unique technology of the meter. It is also approved for aseptic applications (3-A).

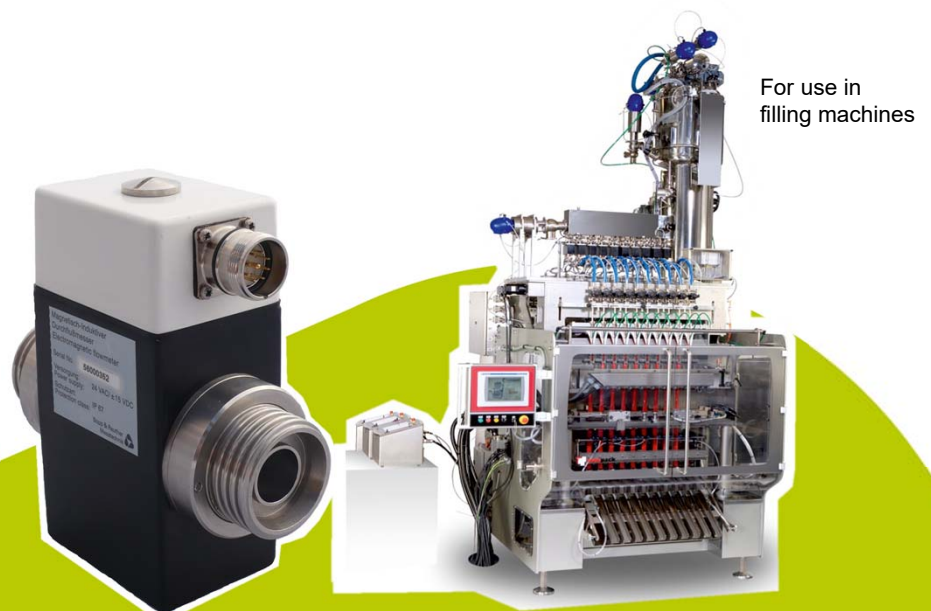
The series includes the nominal widths DN10 - 40 and fulfils pressure level PN10/16. The maximum temperature is 140°C. Various connections are available.

## 3. PRINCIPLE OF OPERATION AND SYSTEM DESIGN

### 3.1 Measurement Principle

Magnetic-inductive flow meters belong to the group of direct volumetric meters. They work according to the Faraday principle. In contrast to all other magnetic-inductive flow meters available in the market, they work in an alternating field (AC)

instead of a synchronised DC field. This enables higher measuring dynamics and quicker, precise measurements for dosing tasks above 0.1 s.



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## 3.2 System design

**Sensor:** The volume is measured via the magnetic-inductive flow meter  
Various electronics are available for further processing. They either provide volume pulses to a primary PLC or process the signals themselves in order to control the filling process.

**UV14 Converter Module** Converts the measuring signal into volume pulses

**MID-MDS System MDS 30/49/84** Converts the measuring signal into volume pulses, controls the valves for the filling process and transfers the data to a primary controller.

MDS30: up to 6 channels  
MDS49: up to 12 channels  
MDS84: up to 18 channels

**MDS-Terminal** Configures and visualizes the MID-MDS system.

## 4. INPUTS

### 4.1 Measured value

Liquid volumes and volumetric flow rate

### 4.2 Measuring range

A speed of  $v = 1 \text{ m/s}$  should be strived for as this ensures optimum product protection and accuracy.  
If the speed is higher, the pressure pulsation increase when closing the valve; if the speed is lower, some products may show deposits.

DN	Resolution Pulses/ml	Flow rate				...	v=10 m/s [ml/s]
		v=0,5 m/s [ml/s]	v=1,0 m/s [ml/s]	v=2,5 m/s [ml/s]	v=10 m/s		
10	63.660	40	80	200		800	
15	28.293	88	176	440		1760	
20	15.915	157	314	785		3140	
25	10.186	245	490	1225		4900	
32	6.216	402	804	2010		8040	
40	3.979	628	1256	3140		12560	

## 5 CHARACTERISTIC PARAMETER

### 5.1 Reference conditions

Pressure: approx. 2 bar  
Temperature: 25°C ±2K  
Warm-up period: 30 min  
Medium: water without trapped gas

### 5.2 Accuracy

±0.5%

### 5.3 Repeatability

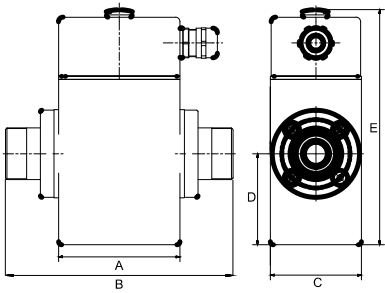
DN10 - 20: >250 ms: ±0.5%; >1.5s: ±0.1%  
DN25 - 40: >1.5s: ±0.35%

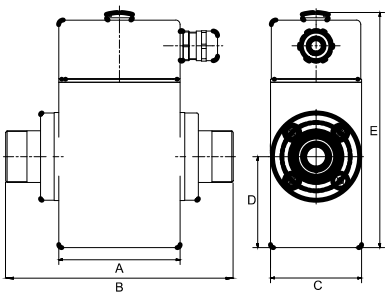
The repeatability of the dosing / filling process in the plant also depends on other factors (e.g. dosing valve, valve outlet, mechanical design of the plant ...).

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## 6 CONSTRUCTIVE DESIGN

### 6.1 Design / dimensions / weights

	<b>Type: Milk thread fitting DIN 405</b>		<b>DN 10</b>	<b>DN 15</b>	<b>DN 20</b>	<b>DN 25</b>	<b>DN 32</b>	<b>DN 40</b>
	<b>Nominal width</b>							
	Dimensions (mm)	<b>A</b>	80	80	80	120	120	120
		<b>B</b>	150	150	150	190	190	190
		<b>C</b>	60	60	60	80	80	80
		<b>D</b>	60	60	60	75	75	75
<b>E</b>		155	155	155	185	185	185	
Weight (kg)		3.5	3.5	3.5	8.1	8.1	8.1	

	<b>Type: TRI-Clamp acc. ...</b>		<b>DIN 32676</b>			<b>DIN 2852</b>		
	<b>Nominal width</b>		<b>DN 10</b>	<b>DN 15</b>	<b>DN 20</b>	<b>DN 25</b>	<b>DN 32</b>	<b>DN 40</b>
	Dimensions (mm)	<b>A</b>	80	80	80	120	120	120
		<b>B</b>	150	150	150	190	190	190
		<b>C</b>	60	60	60	80	80	80
		<b>D</b>	60	60	60	75	75	75
<b>E</b>		155	155	155	185	185	185	
Weight (kg)		3.5	3.5	3.5	8.1	8.1	8.1	

Other connections upon request (e.g. Naue sterile connection, Tri-Clamp ... )

### 6.2 Material

	<b>DN 10</b>	<b>DN 15</b>	<b>DN 20</b>	<b>DN 25</b>	<b>DN 32</b>	<b>DN 40</b>
Process connection	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Lining	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Electrodes	Stainless steel	Hastelloy	Hastelloy	Hastelloy	Hastelloy	Hastelloy
Transducer enclosure	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Pre-amplifier enclosure	Cast aluminium, coated	Cast aluminium, coated	Cast aluminium, coated	Cast aluminium, coated	Cast aluminium, coated	Cast aluminium, coated

Other materials upon request

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## 7. OPERATING CONDITIONS

### 7.1 Ingress protection

IP67  
Ingress protection for enclosure as per IEC 529 / EN 60529

### 7.2 Ambient temperature / humidity

Ambient temperature: 0 to +50°C  
Ambient humidity: < 75% annual average,  
condensation permitted

### 7.3 Material temperature

For measuring: 0 to +90°C, for cleaning +140°C

### 7.4 Process pressure – process connection

Milk thread fitting connection: PN 10  
Sterile connection: PN 16  
Tri-Clamp: PN 16  
NEUMO small flange: PN 16

### 7.5 Measuring cable

Maximum length: 250m  
Cable type: LIY-2CY-LIYCY

### 7.6 Conductivity of the medium

Minimum conductivity: 1 µS/cm

### 7.7 Pressure loss

Pressure loss can be neglected

## 8. CERTIFICATES AND APPROVALS

### 3-A Sanitary Standards for flow meters

Certificate number 976 (since 09/1998)

#### Directive 2014/30/EU (EMC Directive)

- **EN 61000-6-2:** Generic standards – Immunity for industrial environments
- **EN 61000-6-3:** Generic standards – Emission standard for residential, commercial and light-industrial environments

#### Directive 2014/68/EU (Pressure Equipment Directive)

- DIN EN 023
- AD leaflets

## 9. DOCUMENTATION

### Operating Manuals

A-EN-05801 Operating Manual - Dosing System MID-MDS Linear Filler  
A-EN-05802 Operating Manual - Dosing System MID-MDS 4 Start Inputs, Single Control  
A-EN-05803 Operating Manual - Dosing System MID-MDS Rotary Filler  
A-EN-05806 Operating Manual - UV14 Input Module