

# ELECTROMAGNETIC FLOWMETER SERIES MID-EMF

## 1. IDENTIFICATION

Manufacturer	Bopp & Reuther Messtechnik Am Neuen Rheinhafen 4 67346 Speyer Phone : +49 6232 657-0 Fax : +49 6232 657-505
Product type	Electromagnetic flowmeter
Product name	Series MID-EMF

## 2. RANGE OF APPLICATION

The field of application for all electromagnetic flowmeters of the MID-EMF series is the measurement of conductive liquids ( $>20\mu\text{S}/\text{cm}$ ) in dosing and filling systems as well as in continuous flow measurement.

The series comprises the nominal diameters DN3 to DN25 and is available in the pressure stages PN6/8/10. The maximum temperature is 60°C. Different connections and output signals are available.

## 3. PRINCIPLE OF OPERATION AND SYSTEM DESIGN

### 3.1 Measurement Principle

Electromagnetic flowmeters belong to the group of indirect volume meters. They operate according to Induction law according to Faraday: If an electrically conductive liquid flows vertically through a magnetic field, an electric field strength is created perpendicular to the magnetic field and in the direction of flow.

The MID-EMFs operate with a synchronized DC field. This ensures a stable zero point. This makes the measurement insensitive to influences such as multiphase substances and inhomogeneity in the liquid.



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## 3.2 System design

**MID-EMF:** The measured value is recorded by the electromagnetic flowmeter. Depending on the version, this outputs volume-proportional pulses, a 4-20mA current or a 0-10 V voltage.

These signals can then be further processed in a downstream PLC or batch controller.

## 4. INPUTS

### 4.1 Measured value

Volume and volumetric flow rate

### 4.2 Measuring Range

The speed  $v = 1 \text{ m/s}$  should be aimed at, because this is the optimum in terms of product protection and accuracy. If the speed is higher, the pressure shocks increase when the valve is closed. If it is lower, deposits can occur with some products.

DN	Flowrate Qmax [l/min]	v=0.5 m/s	v=1.0 m/s	v=2.5 m/s	...	v=10 m/s	K-Factor Imp/l
		[ml/s]	[ml/s]	[ml/s]		[ml/s]	
3	2	4.2	8.4	21		84	50 000
6	5	13.9	28	70		280	25 000
8	20	21	42	105		420	10 000
15	50	88	176	440		1760	5000
20	200	157	314	785		314	2500
25	250	245	490	1225		4900	1200

## 5. OUTPUTS

- Pulses
- Current: 4-20 mA
- Voltage: 0-10 V

depending on configuration

## 6. CHARACTERISTIC PARAMETER

### 6.1 Reference conditions

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

### 6.2 Accuracy

±0.7% of the measured value, ±0.3% from measuring range end value

### 6.3 Repeatability

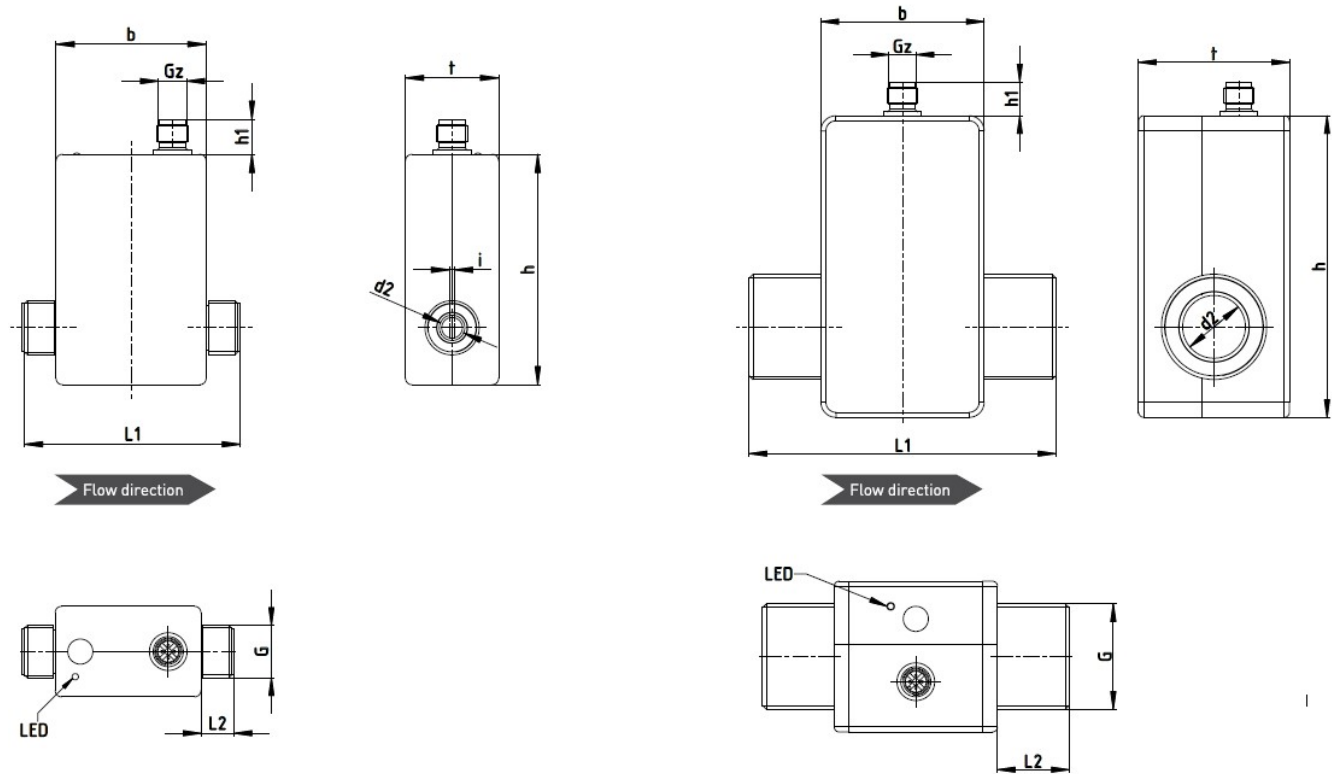
±1%

However, the reproducibility of the dosing/filling in the plant also depends on other factors (e.g. dosing valve, valve outlet, density of the liquid, temperature changes, mechanical design of the plant, ...).

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## 7. CONSTRUCTIVE DESIGN

### 7.1 Design / dimensions / weights



MID-EMF		DN 3	DN 6	DN 8	DN 15	DN 20	DN 25
Dimensions (mm)	L1	85	85	85	90	90	122
	L2	13	13	13	16	16	28.5
	G	G $\frac{3}{8}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{3}{4}$ B	G1B	G1 $\frac{1}{4}$ B
	d2	Ø3	Ø8	Ø8	Ø14	Ø18	Ø25
	b	58	58	58	58	58	58
	Gz	M12x1	M12x1	M12x1	M12x1	M12x1	M12x1
	h	89	89	89	89	89	89
	h1	13.5	13.5	13.5	13.5	13.5	13.5
	t	36	36	36	36	36	36
	i		2				
Weight (kg)		0.215	0.225	0.23	0.235	0.245	0.625

### 7.2 Material

Housing: ABS  
Electrodes and grounding rings: Stainless steel 1.4404

Measuring tube and process connections: PVDF  
O-ring: EPDM

### 7.3 Inlet and outlet section

Inlet section: 10xDN      outlet section: 5xDN

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## 8. OPERATING CONDITIONS

### 8.1 Ingress protection

IP65 (with plugged on coupling socket)  
Protection class for housing IP according to IEC 529/EN60529

### 8.2 Ambient temperature

+5°C to +60°C

### 8.3 Fluid temperature

+5°C to +60°C (unfreezing)

### 8.4 Process pressure

10 bar at 20°C, 8 bar at 40°C, 6 bar at 60°C

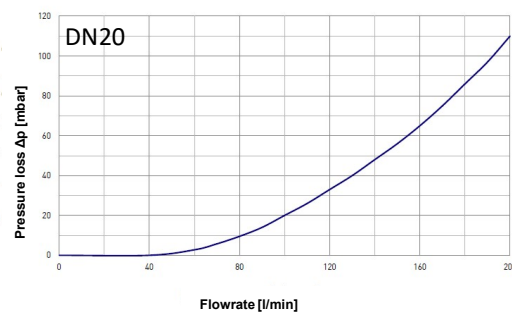
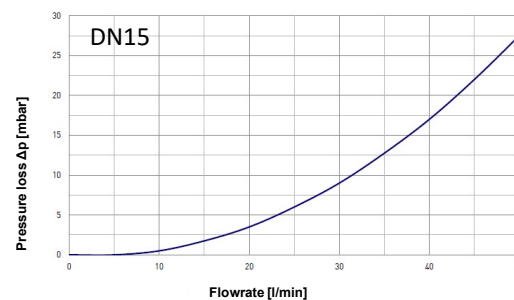
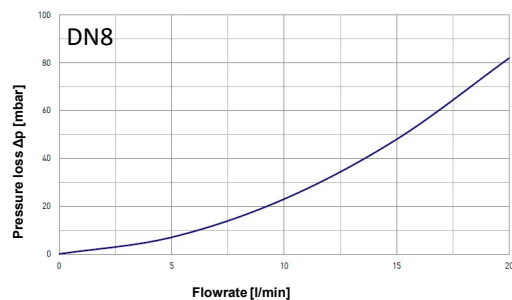
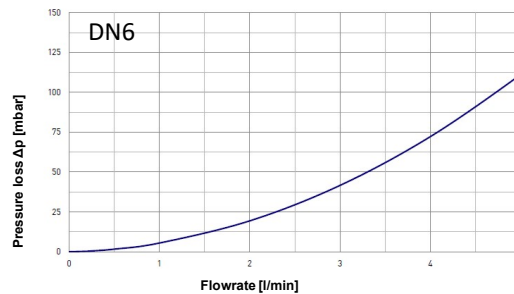
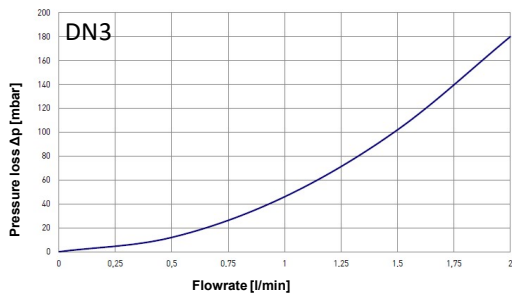
### 8.5 Response time

<100ms

### 8.6 Conductivity of the medium

Minimum conductivity : 20 µS/cm

### 8.7 Pressure loss



## 9. CERTIFICATES AND APPROVALS

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

- EN 61000-6-2: Generic standards – Immunity for industrial Environments

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

## 10. DOCUMENTATION

### Operating manual

A-EN-9003-EMF Operating Manual - MID-EMF