Electromagnetic flowmeter for volumetric filling machines
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1.1 Intended use

The electromagnetic flowmeter is designed exclusively for measuring the volumetric flowrate of electrically conductive, liquid process products.

Minimum electrical conductivity:
• > 5 μS/cm (except for water)
• > 20 μS/cm (for water)

1.2 Certification

CE marking

The manufacturer certifies successful testing of the product by applying the CE marking.

This device fulfills the statutory requirements of the relevant EU directives. For full information of the EU directives and standards and the approved certifications, please refer to the CE declaration or the website of the manufacturer.
1.3 Safety instructions from the manufacturer

1.3.1 Copyright and data protection

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1.3.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.
1.3.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.3.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer can not accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.
1.3.5 Warnings and symbols used

Safety warnings are indicated by the following symbols.

**DANGER!**
This warning refers to the immediate danger when working with electricity.

**DANGER!**
This warning refers to the immediate danger of burns caused by heat or hot surfaces.

**DANGER!**
This warning refers to the immediate danger when using this device in a hazardous atmosphere.

**DANGER!**
These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator’s plant.

**WARNING!**
Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator’s plant.

**CAUTION!**
Disregarding these instructions can result in damage to the device or to parts of the operator’s plant.

**INFORMATION!**
These instructions contain important information for the handling of the device.

**LEGAL NOTICE!**
This note contains information on statutory directives and standards.

- **HANDLING**
  This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

- **RESULT**
  This symbol refers to all important consequences of the previous actions.

1.4 Safety instructions for the operator

**WARNING!**
In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel. This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.
2.1 Scope of delivery

**INFORMATION!**
Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

**INFORMATION!**
Do a check of the packing list to make sure that you have all the elements given in the order.

**INFORMATION!**
Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

![Figure 2-1: Scope of delivery](image)

1. Flowmeter in ordered size
2. Product documentation (on request)

**INFORMATION!**
Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.
2.2 Device description

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

**INFORMATION!**

Product specific information and extensive product specification is available using PICK, the Product Information Center KROHNE web-tool.

PICK can be found via the service menu button on the KROHNE.com website.

The following compact versions are available:

- Version 1: converter directly mounted on cast sensor housing in size DN2.5..6
- Version 2: converter and sensor in solid cast BNG construction for DN10 and DN 15
- Version 3: converter mounted on conventional sensor construction (DN25 and DN40)

![Figure 2-2: Device version](image)

1. DN2.5 - 4 - 6 (⅛ - ⅝ -⅛)
2. DN10 - DN15 (⅜ - ⅝ -⅛)
3. DN25 - DN40 (1 - 1⅛ -⅛)
2.3 Nameplate (example)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name and address of the manufacturer</td>
</tr>
<tr>
<td>2</td>
<td>Type designation, S/N nr and year of manufacturing</td>
</tr>
<tr>
<td>3</td>
<td>Calibration and device data</td>
</tr>
<tr>
<td>4</td>
<td>Tag number</td>
</tr>
<tr>
<td>5</td>
<td>Marking (e.g. CE and logo of certifications)</td>
</tr>
<tr>
<td>6</td>
<td>Electrical values and software revision nr.</td>
</tr>
<tr>
<td>7</td>
<td>Output data</td>
</tr>
<tr>
<td>8</td>
<td>Additional info (e.g. manufacturer website)</td>
</tr>
</tbody>
</table>

Figure 2-3: Example of nameplate

![Image of nameplate]
3.1 General notes on installation

**INFORMATION!**
Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

**INFORMATION!**
Do a check of the packing list to make sure that you have all the elements given in the order.

**INFORMATION!**
Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Storage

- Store the device in a dry and dust-free location.
- Avoid lasting direct exposure to the sun.
- Store the device in its original packaging.
- Storage temperature: -50 ...+70°C / -58...+158°F

3.3 Pre-installation requirements

Make sure that you have all necessary tools available:

- Small wrench (M5) for connection to ground
- Torque wrench for installing flowmeter in pipeline
  Always tighten the bolts uniformly and in diagonally opposite sequence!

Accessories necessary for the correct installation are available on request at the manufacturer

Make sure that these accessories are available before starting installation;

- O-rings / L-ring gasket
- Special pipe flanges
- Stud bolts with lockwasher, plain washer and nut

**INFORMATION!**
To facilitate servicing and/or exchanging of the device, please note that:
it must be possible to shut off the flow through the pipeline (control valve upstream in pipeline).
Drain the pipeline before removing device (provide drain valve)
3.4 General requirements

INFORMATION!
The following precautions must be taken to ensure a reliable installation.

- Make sure that there is adequate space to the sides.
- Protect the signal converter from direct sunlight and install a sun shade if necessary.
- Support the pipeline on both side of the flowmeter.
- Do not expose the signal converter to intense vibration. The flowmeters are tested for a vibration level in accordance with IEC 60068-2-64.

3.4.1 Vibration

Figure 3-1: Avoid vibrations

3.4.2 Magnetic field

Figure 3-2: Avoid strong magnetic fields
3.5 Installation conditions

CAUTION!
Install in a slightly descending pipe section to prevent air from collecting and to avoid faulty measurements (meter can drain).

3.5.1 Inlet and outlet

Figure 3-4: Inlet and outlet section

1. ≥ 5 DN
2. ≥ 2 DN
3. Drain valve (to empty pipeline)

3.5.2 Open feed or discharge

Figure 3-5: Installation in front of an open discharge

$\angle \alpha > 2^\circ$

1. Drain valve (to empty pipeline)
3.5.3 Pump

![Diagram of installation behind a pump](image1)

Figure 3-6: Installation behind a pump

3.5.4 Control valve

![Diagram of installation in front of a control valve](image2)

Figure 3-7: Installation in front of a control valve

3.5.5 Mounting position

![Diagram of installation in bending pipes](image3)

Figure 3-8: Installation in bending pipes

\[ \alpha > 2^\circ \]

1. Drain valve (to empty pipeline)

**CAUTION!**

To ensure a correct measurement, avoid draining or partial filling of the flow sensor during operation.

**WARNING!**

Vertical down position only in conjunction of a control valve
3.5.6 Mounting

3.5.7 Installation location

CAUTION!
Mount the flow sensor in such a way that the electrode axis (X--------X) is approximately in a horizontal pipe run.

3.5.8 Flange deviation

CAUTION!
Max. permissible deviation of pipe flange faces: \( L_{\text{max}} - L_{\text{min}} \leq 0.5 \text{ mm} / 0.02" \)
3.5.9 Temperatures

**Process temperature vs ambient temperature**

![Temperature Chart](chart.png)

1. Ambient temperature
2. Process temperature

**INFORMATION!**
Avoid installation near hot product tanks. If possible, try to insulate the flowmeter from radiant heat sources.

**CAUTION!**
On high temperature pipes and where temperatures exceed 100 °C / 212 °F, provide facilities to compensate for longitudinal expansion of pipeline (due to heat-up). Use flexible pipe elements (e.g. elbows).

3.5.10 Hot filling

**Installation position**

![Installation Position](position.png)

Figure 3-11: In case of hot fluids
4.1 Safety instructions

**DANGER!**
All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

**DANGER!**
Observe the national regulations for electrical installations!

**WARNING!**
Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

**INFORMATION!**
Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Grounding

**CAUTION!**
The grounding should not transmit any interference voltage. Therefore do not ground any other electrical device at the same conductor.

**CAUTION!**
When connecting to functional extra-low voltages (24VDC), ensure that you use protective separation (PELV) according to IEC 364/IEC 536 or VDE 0100/VDE 0108.

**CAUTION!**
Do not remove the secured (glued) adjusting screw. Removing the screw will affect the gas tightness and durability of the device.
4.3 Electrical connection

4.3.1 Cable connector M12 - 5 pin

All the operating data are preset at the factory. For changing the parameters and diagnostic purposes BATCHMon plus operation software can be used.

Note; the switch circuits have a resistance of approximately 76 Ohms
4.3.2 Cable connector M12 - 8 pin (with status output)

The 8 pin electric connection has a status output. This status output, is configurable to customer specifications and offers either the flow direction (of the medium) or an error signal.

Options on status output: Off / Error / Flow direction

Note; the switch circuits have a resistance of approximately 76 Ohms
Mode
- Status output On / Off
- Flow direction
  - Default value: Flow Direction
  - Forward flow: status output; open
  - Reversed flow: status output; closed
- Error software / application failure

Error signaling for following events: software failure or application failure (detection of empty pipe only). No error; status output open

Use one of the following attachment plug types to connect the flowmeter to a third party system:
- moulded plug, straight or angle-entry form
- integrally extruded plug with cable in various lengths
- moulded plug, straight form, especially suitable for high-interference environments

Possible vendors of these plugs are:
- Binder
- Hirschmann
- Lumberg
- Amphenol
- Coninvers
5.1 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are subject to wear and tear under normal operating conditions.

5.2 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.

INFORMATION!
For more precise information, please contact your local sales office.

5.3 Returning the device to the manufacturer

5.3.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.

CAUTION!
Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

• Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.

• This means that the manufacturer can only service this device if it is accompanied by the following certificate [see next section] confirming that the device is safe to handle.

CAUTION!
If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

• to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,

• to enclose a certificate with the device confirming that is safe to handle and stating the product used.
5.3.2 Form (for copying) to accompany a returned device

CAUTION!
To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

<table>
<thead>
<tr>
<th>Company:</th>
<th>Address:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department:</td>
<td>Name:</td>
</tr>
<tr>
<td>Tel. no.:</td>
<td>Fax no. and/or Email address:</td>
</tr>
<tr>
<td>Manufacturer’s order no. or serial no.:</td>
<td></td>
</tr>
</tbody>
</table>

The device has been operated with the following medium:

This medium is:
- radioactive
- water-hazardous
- toxic
- caustic
- flammable

We checked that all cavities in the device are free from such substances.
We have flushed out and neutralized all cavities in the device.

We hereby confirm that there is no risk to persons or the environment through any residual media contained in the device when it is returned.

Date: Signature: Stamp:

5.4 Disposal

CAUTION!
Disposal must be carried out in accordance with legislation applicable in your country.

Separate collection of WEEE (Waste Electrical and Electronic Equipment) in the European Union:

According to the directive 2012/19/EU, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life must not be disposed of with other waste. The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.
6.1 Measuring principle

An electrically conductive fluid flows inside an electrically insulated pipe through a magnetic field. This magnetic field is generated by a current, flowing through a pair of field coils. Inside of the fluid, a voltage $U$ is generated:

$$U = v \cdot k \cdot B \cdot D$$

in which:
- $v =$ mean flow velocity
- $k =$ factor correcting for geometry
- $B =$ magnetic field strength
- $D =$ inner diameter of flowmeter

The signal voltage $U$ is picked off by electrodes and is proportional to the mean flow velocity $v$ and thus the flow rate $Q$. A signal converter is used to amplify the signal voltage, filter it and convert it into signals for totalizing, recording and output processing.

![Figure 6-1: Measuring principle](image)

- ① Field coils
- ② Magnetic field
- ③ Electrodes
- ④ Induced voltage (proportional to flow velocity)
6.2 Technical data

INFORMATION!
• The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.
• Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).

Measuring system

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Faraday’s law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application range</td>
<td>Electrically conductive fluids</td>
</tr>
</tbody>
</table>

### Measured value

<table>
<thead>
<tr>
<th>Primary measured value</th>
<th>Flow velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary measured value</td>
<td>Volume flow</td>
</tr>
</tbody>
</table>

Design

<table>
<thead>
<tr>
<th>Features</th>
<th>Standard wet calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modular construction</td>
<td>The measurement system consists of a flow sensor and a signal converter. It is only available as compact version.</td>
</tr>
<tr>
<td>Compact version</td>
<td>BATCHFLUX 5500 C</td>
</tr>
<tr>
<td>Nominal diameter</td>
<td>DN2.5...40 / 0.1...1½“</td>
</tr>
<tr>
<td>Measurement range</td>
<td>-12...+12 m/s / -39...+39 ft/s</td>
</tr>
</tbody>
</table>

User interface

<table>
<thead>
<tr>
<th>Operating data</th>
<th>Factory set to customer specification.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Machine Interface (HMI)</td>
<td>Option: BATCHMon Plus software</td>
</tr>
<tr>
<td>Cable connections</td>
<td>Standard; 1x M12, 5-pin connector</td>
</tr>
<tr>
<td></td>
<td>With status output; 1x M12, 8-pin connector</td>
</tr>
</tbody>
</table>
# Measuring accuracy

| Reference conditions | Medium: water  
|----------------------|----------------------------------------------------------|
|                      | Inlet / outlet section: 10 DN / 5 DN  
|                      | Valve closing time variation: < 1 ms  
|                      | Flow velocity: 1 m/s, flow conditions similar to EN 29104  
|                      | Operating pressure: 1 bar / 14.5 psi  

## Error limits at reference conditions for tap water, 400 μS/cm, 20°C / 68°F:

| Maximum measuring error | DN2.5...6:  
|--------------------------|----------------------------------------------------------|
| v ≤ 1 m/s               | ±0.4% of measured value + 1 mm/s  
| v > 1 m/s               | ±0.5% of measured value  
| DN10...15:              | ±0.2% of measured value + 1 mm/s  
| DN25...40:              | v ≤ 1 m/s: ±0.2% of measured value + 1 mm/s  
|                         | v > 1 m/s: ±0.3% of measured value  

| Repeatability | DN2.5...6 / DN25...40:  
|---------------|----------------------------------------------------------|
| Filling time 1.5...3 s: | ≤ 0.4%  
| Filling time 3...5 s: | ≤ 0.2%  
| Filling time > 5 s: | ≤ 0.1%  
| DN10...15:  | Standard deviation:  
| Filling time 1.5...3 s: | ≤ 0.3%  
| Filling time 3...5 s: | ≤ 0.15%  
| Filling time > 5 s: | ≤ 0.08%  

## Error limits at reference conditions for hot water, 400 μS/cm, 80°C / 176°F:

| Maximum measuring error | DN10...15:  
|--------------------------|----------------------------------------------------------|
|                         | ±0.2% of measured value + 1 mm/s  

| Repeatability | DN10...15:  
|---------------|----------------------------------------------------------|
| Filling time 1.5...3 s: | ≤ 0.3%  
| Filling time 3...5 s: | ≤ 0.2%  
| Filling time > 5 s: | ≤ 0.1%  

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### Operating conditions

#### Temperature

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process temperature</td>
<td>Dependent on ambient temperature. See chapter “Temperatures”.</td>
</tr>
</tbody>
</table>
| Cleaning temperature    | SIP: Maximum 1 hour at 150°C / +302°F  
                         | CIP: Maximum 1 hour, at 140°C / +284°F |
| Shock                   | ≤ 3 K/s       |
| Ambient temperature     | -40…+60°C / -40…+140°F |
| Storage temperature     | -50…+70°C / -58…+158°F |

#### Pressure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient</td>
<td>Atmospheric</td>
</tr>
</tbody>
</table>
| Process pressure         | up to 16 bar / 232 psi for DN10...15  
                         | up to 40 bar / 580 psi for DN2.5...6 / DN25...40  
                         | Option: DN25 up to 200 bar / 2900 psi |
| Vacuum load              | 0 mbar / 0 psig |

#### Chemical properties

<table>
<thead>
<tr>
<th>Physical condition</th>
<th>Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical conductivity</td>
<td>≥ 5 µS/cm (≥ 20 µS/cm for demineralised water)</td>
</tr>
</tbody>
</table>
| Recommended flow velocity | -12...+12 m/s / -39...+39 ft/s  
                         | -6...+6 m/s / -20...+20 ft/s |

#### Installation conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>For detailed information see chapter “Installation”.</td>
</tr>
<tr>
<td>Inlet run</td>
<td>≥ 5 DN</td>
</tr>
<tr>
<td>Outlet run</td>
<td>≥ 2 DN</td>
</tr>
<tr>
<td>Dimensions and weights</td>
<td>For detailed information see chapter “Dimensions and weights”.</td>
</tr>
</tbody>
</table>

#### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor- and converter housing</td>
<td>Stainless steel 1.4404 / 1.4408</td>
</tr>
<tr>
<td>Measuring tube</td>
<td>Fused in-place Zirconium oxide</td>
</tr>
</tbody>
</table>
| Measuring electrodes             | Fused-in cermet (DN2.5...25)  
                         | DN40: Platinum |

#### Process connections

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>Sandwich design</td>
</tr>
<tr>
<td></td>
<td>Optional: Pressure relief groove at flange facing of the sensor</td>
</tr>
<tr>
<td></td>
<td>Construction drawings of recommended counter flanges are available on the manufacturer website, under services.</td>
</tr>
</tbody>
</table>
# TECHNICAL DATA

## BATCHFLUX 5500 C

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### Electrical connections

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24 VDC ± 25%</td>
</tr>
<tr>
<td>Power consumption</td>
<td>≤ 3 W</td>
</tr>
<tr>
<td>Switch on current</td>
<td>≤ 5 A (≤ 100 µs) at 24 VDC</td>
</tr>
<tr>
<td>Voltage loss</td>
<td>Possible for a maximum of 20 ms according to NAMUR NE21.</td>
</tr>
<tr>
<td>BATCHMON</td>
<td>For parameter setting and diagnostic purposes, communication via PC with a single device [optional]</td>
</tr>
<tr>
<td>Status output</td>
<td>Configurable; error, flow direction, on/off</td>
</tr>
</tbody>
</table>

### Frequency output

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency (passive) / galvanically isolated from power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>All operating data preset at factory.</td>
</tr>
<tr>
<td>Interval</td>
<td>Counter gate time ≥ 1000 / (P_{100%} \text{ [Hz]})</td>
</tr>
<tr>
<td>Frequency output</td>
<td>≤ 10 kHz</td>
</tr>
<tr>
<td>Pulse width at full scale value</td>
<td>≤ 10 Hz: 50, 100, 200 or 500 ms</td>
</tr>
<tr>
<td></td>
<td>&gt; 10 Hz: automatic, pulse width = 1 / (2 x (f_{100%})) or symmetrical, 1:1</td>
</tr>
<tr>
<td>Passive operation</td>
<td>Connection of electronic or electromechanical counters.</td>
</tr>
<tr>
<td></td>
<td>External voltage: ≥ 5 ≤ 30 VDC / ≤ 24 VAC</td>
</tr>
<tr>
<td></td>
<td>Load: (I_{\text{max}}) ≤ 20 mA</td>
</tr>
<tr>
<td>Low flow cut-off</td>
<td>Threshold: 0...20 %</td>
</tr>
<tr>
<td></td>
<td>Hysteresis: 0...20 %</td>
</tr>
<tr>
<td></td>
<td>Hysteresis ≤ threshold</td>
</tr>
<tr>
<td></td>
<td>Depending on customers specifications.</td>
</tr>
</tbody>
</table>

### Approvals and certifications

#### CE

This device fulfills the statutory requirements of the EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.

For full information of the EU directives and standards and the approved certifications, please refer to the CE declaration or the website of the manufacturer.

#### Other approvals and standards

<table>
<thead>
<tr>
<th>Approval Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection category acc. to</td>
<td>DN2.5...6 / DN25...40: IP 66/67</td>
</tr>
<tr>
<td>IEC 529 / EN 60529</td>
<td>DN10...15: IP 69K</td>
</tr>
<tr>
<td>Shock test</td>
<td>IEC 68-2-27 30g, half sine, time 18ms.</td>
</tr>
<tr>
<td>Vibration test</td>
<td>IEC 60068-2-64 ; (f_1 = 20 - 2000\text{Hz. rms a} = 4.5g, t = 30\text{min.})</td>
</tr>
<tr>
<td>Hygienic</td>
<td>DN2.5...40; 3A</td>
</tr>
<tr>
<td></td>
<td>FDA approved materials</td>
</tr>
</tbody>
</table>
6.3 Dimensions and weights

DN2.5...6

![Figure 6-2: Dimensions](image)

1. [Grounding]
2. M12; 5 - 8 pins connector

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>DN2.5</td>
<td>50</td>
<td>156</td>
</tr>
<tr>
<td>DN4</td>
<td>50</td>
<td>156</td>
</tr>
<tr>
<td>DN6</td>
<td>50</td>
<td>156</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Dimensions [inches]</th>
<th>Weight [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>1/10&quot;</td>
<td>1.97</td>
<td>6.14</td>
</tr>
<tr>
<td>1/6&quot;</td>
<td>1.97</td>
<td>6.14</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>1.97</td>
<td>6.14</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle
### Nominal Size DN10...15

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a   b  c d e f  g h i</td>
<td></td>
</tr>
<tr>
<td>DN10</td>
<td>50  140 179 10.5 → 8 45.4  60 106.5  88  54</td>
<td>1.4</td>
</tr>
<tr>
<td>DN15</td>
<td>50  140 179 14 → 12 45.4  60 106.5  88  54</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle.

### Nominal Size DN10...15

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Dimensions [inches]</th>
<th>Weight [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a   b  c d e f  g h i</td>
<td></td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>1.97  5.51 7.05 0.41 → 0.31 1.79  2.36 4.19  3.46  2.13</td>
<td>3.1</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>1.97  5.51 7.05 0.55 → 0.47 1.79  2.36 4.19  3.46  2.13</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle.
### Nominal size

#### Dimensions [mm]

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN25</td>
<td>50</td>
<td>170</td>
<td>204</td>
<td>26 → 20</td>
<td>68</td>
<td>102</td>
<td>141</td>
<td>128</td>
<td>58</td>
<td>1.6</td>
</tr>
<tr>
<td>DN40</td>
<td>50</td>
<td>177</td>
<td>219</td>
<td>39 → 30</td>
<td>84</td>
<td>117</td>
<td>141</td>
<td>128</td>
<td>83</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle.

#### Dimensions [inches]

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>Weight [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>1.97</td>
<td>6.69</td>
<td>8.03</td>
<td>1.02 → 0.79</td>
<td>2.68</td>
<td>4.02</td>
<td>5.55</td>
<td>5.04</td>
<td>2.28</td>
<td>3.6</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>1.97</td>
<td>6.97</td>
<td>8.62</td>
<td>1.54 → 1.18</td>
<td>3.30</td>
<td>4.61</td>
<td>5.55</td>
<td>5.04</td>
<td>3.27</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Note on dimension d: As the diameter reduces to the middle, the diameter is specified for the inlet and for the middle.

---

**Figure 6-3: Dimensions**

1. Grounding
2. M12, 5 - 8 pins connector
6.4 Measurement accuracy

Every electromagnetic flowmeter is calibrated by direct volume comparison. The wet calibration validates the performance of the flowmeter under reference conditions against accuracy limits.

The accuracy limits of electromagnetic flowmeters are typically the result of the combined effect of linearity, zero point stability and calibration uncertainty.

Reference conditions

- Medium: water
- Temperature: +5...35°C / +41...95°F
- Operating pressure: 0.1...5 barg / 1.5...72.5 psig
- Inlet section: ≥ 5 DN
- Outlet section: ≥ 2 DN

![Figure 6-4: Measuring accuracy](Image)

X [m/s]: Flow velocity; Y [%]: Maximum measuring error

<table>
<thead>
<tr>
<th>Size</th>
<th>Velocity</th>
<th>Accuracy</th>
<th>Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN2.5...6 / 1/10...1/4&quot;</td>
<td>v ≤ 1 m/s</td>
<td>0.4% of measured value + 1 mm/s</td>
<td>①</td>
</tr>
<tr>
<td></td>
<td>v &gt; 1 m/s</td>
<td>0.5% of measured value</td>
<td></td>
</tr>
<tr>
<td>DN10...15 / 3/8...1/2&quot;</td>
<td></td>
<td>0.2% of measured value + 1 mm/s</td>
<td>③</td>
</tr>
<tr>
<td>DN25...40 / 1...1½&quot;</td>
<td>v ≤ 1 m/s</td>
<td>0.2% of measured value + 1 mm/s</td>
<td>②</td>
</tr>
<tr>
<td></td>
<td>v &gt; 1 m/s</td>
<td>0.3% of measured value</td>
<td></td>
</tr>
</tbody>
</table>
6.5 Counter Flanges

The BATCHFLUX 5500 must be mounted between counter flanges (as shown in the following drawing), to ensure that the device works correctly.

Sizes of flanges

<table>
<thead>
<tr>
<th>DN</th>
<th>Flange</th>
<th>a [mm]</th>
<th>b [mm]</th>
<th>c [mm]</th>
<th>d [mm]</th>
<th>O-ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5...10</td>
<td>Flange (1)</td>
<td>* see table below</td>
<td>* see table below</td>
<td>* see table below</td>
<td>Ø 30.4</td>
<td>Special L-ring</td>
</tr>
<tr>
<td>15</td>
<td>Flange (2)</td>
<td>Ø 14.2</td>
<td>Ø 19.2</td>
<td>Ø 26.6</td>
<td>Ø 30.4</td>
<td>15.47 * 3.53</td>
</tr>
<tr>
<td>25</td>
<td>Flange (3)</td>
<td>Ø 25</td>
<td>Ø 31.3</td>
<td>Ø 41.2</td>
<td>Ø 49.2</td>
<td>15.47 * 3.53</td>
</tr>
</tbody>
</table>

Note: flanges must be fully welded and surface roughness, grinded and polished (roughness 0.8). See for more information the 3A CCE 2007-2 Coordination Bulletin.

INFORMATION!
The O-rings require periodic inspection and replacement. As the interval depends on process-specific variables, the length of the interval cannot be specified.
The O-rings are not part of the manufacturer portfolio.

INFORMATION!
For 3A applications, O-rings must conform to the requirements of the 3A sanitary standard for Flow meters, number 28-04 Class I or Class II (max. 8% milk fat).
The used O-rings must also withstand the processing, sterilization and chemical conditions for the intended use (for more information, contact the manufacturer).
Reference to specific dimensions and drawing numbers

<table>
<thead>
<tr>
<th>Size DN</th>
<th>Pcd [mm]</th>
<th>D [mm]</th>
<th>W [mm]</th>
<th>Drawing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,5</td>
<td>Ø 56</td>
<td>Ø 68</td>
<td>14.5</td>
<td>4000587801</td>
</tr>
<tr>
<td>4</td>
<td>Ø 56</td>
<td>Ø 68</td>
<td>14.5</td>
<td>4000587807</td>
</tr>
<tr>
<td>6</td>
<td>Ø 56</td>
<td>Ø 68</td>
<td>14.5</td>
<td>4000587810</td>
</tr>
<tr>
<td>10</td>
<td>Ø 56</td>
<td>Ø 68</td>
<td>14.5</td>
<td>4000587815</td>
</tr>
<tr>
<td>15</td>
<td>Ø 56</td>
<td>Ø 68</td>
<td>14.9</td>
<td>4000587818</td>
</tr>
<tr>
<td>25</td>
<td>Ø 84</td>
<td>Ø 104</td>
<td>16.5</td>
<td>4000587824</td>
</tr>
<tr>
<td>40</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
</tbody>
</table>

# Dimensions for DN40; on request

INFORMATION!
Detailed construction drawings of the above sketches are available from the manufacturer website (see table for drawing numbers)
KROHNE – Process instrumentation and measurement solutions

- Flow
- Level
- Temperature
- Pressure
- Process Analysis
- Services

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