Mass flowmeter for process batching
OPTIBATCH 4011 C

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1.1 Intended use
This flowmeter has been specifically designed for the fast batching measurement of mass or volume and is intended for use in filling machines or bespoke applications.

1.2 CE certification

CE marking

This device conforms with the following EC directives:

- EMC Directive 2004/108/EC
- Low Voltage Directive 2006/95/EC
- Pressure Equipment Directive 97/23/EC

The manufacturer declares conformity and the device carries the CE mark.

1.3 Associated documents

This handbook should be read in conjunction with relevant documents in relation to:

- hazardous areas
- communications
- concentration
- corrosion

1.4 Dirty gas

Dirty gas is gas that carries sand or other solid particles. Dirty gas causes excessive wear to the primary measuring tube that can eventually result in complete tube failure. In some situations tube failure where gas is being measured, can be very dangerous.

DANGER!
If the meter is being used to measure gas and there is a risk that the gas might be dirty, you must fit a filter upstream of the meter to catch solid particles.
1.5 Safety instructions from the manufacturer

1.5.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

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We draw your attention to the fact that data transmission over the Internet (e.g. when communicating by e-mail) may involve gaps in security. It is not possible to protect such data completely against access by third parties.

We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.5.2 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.
1.5.3 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.

1.5.4 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.
1.5.5 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.

1.6 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.
Device description

2.1 Scope of delivery

If any items are missing, please contact the manufacturer.

2.2 Device description

This device has been designed for the mass or volume measurement of liquid products in batching and filling machines.

With excellent repeatability and low flow stability, the device is supplied ready to install and operate. The operating data is factory set according to the order specification but can be changed with the use of Toolbox.

CAUTION!
Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

INFORMATION!
This device is a Group 1, Class A device as specified within CISPR11:2009. It is intended for use in industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

INFORMATION!
The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.
3 INSTALLATION

3.1 Storage

- Store the device in a dry and dust-free location.
- Avoid direct exposure to the sun.
- Store the device in its original packing.
- Do not allow the ambient temperature to fall below -50°C / -58°F or rise above +85°C / +185°F.

3.2 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.
3.3 Mounting restrictions

3.3.1 General installation principles

1. Fully support the weight of the meter. The meter can be supported with clamps close to the connecting flanges.
2. Do not use extreme reductions in process pipework size.
3. Make sure that the process pipework is full at all times.
4. Do not let the flow fall in the process pipework. Low process flow will cause a measuring error.
5. If the meter has been installed with an open-ended down-pipe, install an orifice plate or restrictor to make sure that the pipework remains full during measurement. A fast-acting batch or shut-off valve should also be installed downstream of the meter.
6. It is recommended that you DO NOT mount the meter at the highest point in the pipework because it can cause air/gas to collect in the meter.

Figure 3-1: General mounting restrictions

- Make sure that the process pipework is full at all times.
- Do not use extreme reductions in process pipework size.
- Fully support the weight of the meter. The meter can be supported with clamps close to the connecting flanges.
3.3.2 Carousel installation

- Where the meter has to be installed at an angle, DO NOT exceed the maximum offset angle.
- If the maximum angle is exceeded, the meter will not self drain.
3.3.3 3A and EHEDG approval

To satisfy the sanitary requirements of the European Hygienic Engineering and Design Group, when installing this meter you MUST give consideration to:

- Installation - install the meter at an angle to allow self-draining (see illustration).
- Cleaning fluids - cleaning fluids should flow uphill with a velocity rate greater than 1.5 m/s / 5 ft/s. If the process flow is downhill, install a flow restrictor downstream of the meter. This will make sure that the meter is completely filled with the cleaning fluid.
- Process connections and seals MUST be in accordance with EHEDG documentation.

The manufacturer also recommends that you refer to EHEDG (www.ehedg.org) document number 8 "HYGIENIC EQUIPMENT DESIGN CRITERIA".

3.3.4 Flow direction

With the orientation of the meter as shown in the illustration (Lumberg® connector offset to the right) the factory set flow direction is left to right.

If the meter has been installed with the process flow running from right to left, the flow direction can be changed through the supplied software Toolbox. Please see the START-UP section.
3.3.5 Lumberg® connector

Lumberg® connector orientation

1. Flow direction
2. Lumberg® connector
3. Keyway
Electrical connections

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!

DANGER!
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

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 Lumberg connections

Electrical and signal connections to the flowmeter are through an 8 pin Lumberg® connector. To connect to the flowmeter, use a Lumberg® RKT 8-282/2 M [straight] or RKWT 8-282/2 M [90° elbow] plug and flying lead. An alternative plug connector with the same pin / keyway configuration, can also be used.

Lumberg® connector
Plug / pin connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PSU + 24 V</td>
<td>White</td>
</tr>
<tr>
<td>2</td>
<td>RS485 A</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>RS485 B</td>
<td>Green</td>
</tr>
<tr>
<td>4</td>
<td>PSU + 0 V</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Pulse +</td>
<td>Grey</td>
</tr>
<tr>
<td>6</td>
<td>Pulse -</td>
<td>Pink</td>
</tr>
<tr>
<td>7</td>
<td>N / C</td>
<td>Blue</td>
</tr>
<tr>
<td>8</td>
<td>N / C</td>
<td>Screen</td>
</tr>
</tbody>
</table>

The pin / colour configurations shown in the table, are for the Lumberg® flying lead. Other manufacturers might use a different pin / colour configuration. If you are not using the Lumberg® flying lead, use the first two columns in the table to assign the correct function to each pin.
4.3 Power supply

- Connection plug pin 1
- Connection plug pin 4
- Meter
- Protected extra-low voltage (PELV) power supply
4.4 Schematic layout (pulse output)

Typical load resistor values

<table>
<thead>
<tr>
<th>Input</th>
<th>Load resistor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 V TTL input</td>
<td>330 Ω</td>
</tr>
<tr>
<td>10...24 V input</td>
<td>1 kΩ</td>
</tr>
</tbody>
</table>
Source input 10...24 V

A V+  
B Input

1. Connection plug pin 5  
2. Connection plug pin 6  
3. Galvanically isolated passive pulse output of the meter  
4. Load resistor. Typical value is 1 kΩ  
5. PLC source input with an impedance greater than 10 kΩ
5.1 Configuration with Toolbox

The meter can be configured using the supplied software and adaptor, which allows connection to a personal computer (PC) or a laptop.

**INFORMATION!**

*When the meter is in configuration mode, the pulse output is not available.*

---

**Connection with Toolbox**

- Connect the meter to a personal computer or laptop using the converter.
- Launch Toolbox but DO NOT try to connect to the meter.
- Connect the meter to the power supply.
- Select either Connection > Connect or Connection > Auto Connect to connect Toolbox to the meter. This MUST be done within 10 seconds of energising the meter.
5.1.1 Manual connection

- Press <F3> or select Connection > Auto Connect.
- The Connect dialogue box will open.
- Select the Port you wish to connect through. The default values for: Baud Rate, Parity, Stop Bits and Slave ID are shown.
- Select OK or Cancel
- Toolbox will connect to the meter.
5.1.2 Automatic connection

An automatic connection can be made with a single meter on a point-to-point basis.

- Press F5 or select: Connection > Auto Connect.
- The Auto Connect dialogue box opens.
- Select the Port you wish to connect through.
- Select OK or Cancel
- Toolbox will connect to the meter.

5.1.3 Connection dialogue

While Toolbox is connecting to the meter, the dialogue box will show the progress.

If you want to stop the connection process, use the Cancel button. When the connection has been made, the dialogue box will close.
5.1.4 Outputs

The meter is pre-configured according to the customer’s order. If it is necessary to change output parameters, it is recommended that only Frequency and Pulse Quantity are changed.

1. Output tab
2. Frequency - sets the maximum pulse frequency to 1 kHz or 10 kHz / mass or volume
3. Pulse Quantity - sets the quantity of each pulse. The units are the same as for Mass Total
5.1.5 Setup

**Ringing**

High-speed valves can cause unwanted tube vibrations that result in surges in the signal amplitude. This effect is referred to as "ringing".

1. Setup tab
2. Suppression time
3. Low Flow Threshold
4. Suppression Cut-Off
5. Flow Direction
For most applications, the Low Flow Threshold will stop ringing affecting the mass flow measurement.

In some applications, the ringing might be above the Low Flow Threshold.
In these applications, use the Suppression Cut Off and Suppression Time parameters to temporarily adjust the Low Flow Threshold. This will stop the ringing from affecting the mass flow measurement.

**Flow Direction**

The factory default flow direction is left to right. The Flow Direction parameter shows the flow as running Forwards. If the meter has been installed with the flow running in the opposite direction, the Flow Direction parameter can be changed to Backwards.

### 5.1.6 Zero calibration

The meter is supplied with a factory set zero calibration but in certain circumstances it might be necessary to re-set the zero calibration. These might be:

- where the highest accuracy is required with very low flow rates
- extreme process conditions (for example where the meter is being used to measure high viscosity liquids).

#### Zero calibration procedure

- Flush the process fluid through the meter
- Close the downstream valve
- Maintain the process pressure
- Select Calibrate. This will start the zero calibration procedure
- When the zero calibration has been set, select Save to store the calibration data
6.1 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.

6.2 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.

6.3 Returning the device to the manufacturer

6.3.1 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, 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.
### 6.3.2 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:

<table>
<thead>
<tr>
<th>This medium is:</th>
<th>radioactive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>water-hazardous</td>
</tr>
<tr>
<td></td>
<td>toxic</td>
</tr>
<tr>
<td></td>
<td>caustic</td>
</tr>
<tr>
<td></td>
<td>flammable</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Date:</th>
<th>Signature:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stamp:</td>
</tr>
</tbody>
</table>

### 6.4 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.
7.1 Measuring principle

A Coriolis twin-tube mass flowmeter consists of two measuring tubes (1) a drive coil (2) and two sensors (3) and (4) that are positioned either side of the drive coil.
When the meter is energised, the drive coil vibrates the measuring tubes causing them to oscillate and produce a sine wave (3). The sine wave is monitored by the two sensors.

When a fluid or gas passes through the tubes, the Coriolis effect causes a phase shift in the sine wave that is detected by the two sensors. This phase shift is directly proportional to the mass flow.

Density measurement is made by evaluation of the frequency of vibration and temperature measurement is made using a Pt500 sensor.
### Measuring system

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Coriolis mass flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application range</td>
<td>Measurement of liquids in batching and filling machines</td>
</tr>
<tr>
<td>Measured values</td>
<td>Mass</td>
</tr>
<tr>
<td>Calculated values</td>
<td>Volume</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>Basic</th>
<th>System consists of a measuring sensor with integral converter to process the output signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Fully welded maintenance-free sensor with twin U-shaped measuring tube</td>
</tr>
<tr>
<td>Variants</td>
<td>Compact version                                                              Integral converter</td>
</tr>
</tbody>
</table>

### Measuring accuracy

#### Mass

- \( Q_{\text{nom}} \times 0.1 \leq Q \pm 0.15\% \) of actual measured flow rate
- \( Q < Q_{\text{nom}} \times 0.1 \pm 0.1\% \) of actual measured flow rate + zero stability

#### Volume

- \( Q_{\text{nom}} \times 0.1 \leq Q \pm 0.2\% \) of actual measured flow rate
- \( Q < Q_{\text{nom}} \times 0.1 \pm 0.15\% \) of actual measured flow rate + zero stability

#### Zero stability

Stainless Steel: 0.005% of nominal flow

#### Repeatability (at reference conditions)

- Filling time: Standard deviation
  - \( 1.5 \text{ s} < \text{Filling time} \leq 3 \text{ s} \)
    - 0.13%
  - \( 3 \text{ s} < \text{Filling time} \leq 5 \text{ s} \)
    - 0.07%
  - \( 5 \text{ s} < \text{Filling time} \)
    - 0.04%

#### Reference conditions

- Warm-up time: 15 min
- Product: Water
- Temperature: +20°C / +68°F
- Operating pressure: 1 barg / 14.5 psig
- Accreditation: UKAS to EN17025
### Operating conditions

<table>
<thead>
<tr>
<th>Nominal flow rates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S08</td>
<td>10 kg/min / 22 lb/min</td>
</tr>
<tr>
<td>S10</td>
<td>22 kg/min / 48.4 lb/min</td>
</tr>
<tr>
<td>S15</td>
<td>72 kg/min / 158.4 lb/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact version</td>
<td>-40...+55°C / -40...+131°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>0...+100°C / 32...+212°F</td>
</tr>
<tr>
<td>SIP/CIP</td>
<td>Maximum +120°C / +248°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal pressure at 20°C / 68°F</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring tube</td>
<td>Stainless Steel -1...40 barg / -14.5...580 psig</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluid properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible physical condition</td>
<td>Liquids</td>
</tr>
<tr>
<td>Permissible gas content (volume)</td>
<td>Contact manufacturer for information.</td>
</tr>
<tr>
<td>Permissible solid content (volume)</td>
<td>Contact manufacturer for information.</td>
</tr>
<tr>
<td>Protection category (acc. to EN 60529)</td>
<td>IP 67, NEMA 6</td>
</tr>
</tbody>
</table>

### Installation conditions

<table>
<thead>
<tr>
<th>Inlet runs</th>
<th>None required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet runs</td>
<td>None required</td>
</tr>
</tbody>
</table>

### Materials

<table>
<thead>
<tr>
<th>Stainless Steel meter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring tube</td>
<td>Stainless Steel 316L [1.4404]</td>
</tr>
<tr>
<td>Surface finish (wetted parts)</td>
<td>Standard Ra 0.8 μm</td>
</tr>
<tr>
<td>Process connections</td>
<td>Stainless Steel 316L [1.4404]</td>
</tr>
<tr>
<td>Outer casing</td>
<td>Stainless Steel 316 [1.4401], hermetically sealed as standard</td>
</tr>
</tbody>
</table>

### Process connections

<table>
<thead>
<tr>
<th>Hygienic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-clamp DIN 32676</td>
<td>DN10...25</td>
</tr>
<tr>
<td>Tri-clamp ISO 2852</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Clamp IDF</td>
<td>10...15A</td>
</tr>
<tr>
<td>DIN 11864-2 Form A</td>
<td>DN20</td>
</tr>
<tr>
<td>Male thread DIN 11851</td>
<td>DN10...25</td>
</tr>
<tr>
<td>Male thread SMS</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Male thread RJT</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>
Electrical Connection

<table>
<thead>
<tr>
<th>Connection</th>
<th>Micro [M12] male, 8 pole [Lumberg PRSFM 8/0.5M]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24 VDC ±20%</td>
</tr>
<tr>
<td>Power consumption</td>
<td>3 W</td>
</tr>
<tr>
<td>Power supply type</td>
<td>Protected extra-low voltage (PELV)</td>
</tr>
</tbody>
</table>

Pulse/Frequency Output

<table>
<thead>
<tr>
<th>Pulse rate for Q = 100%</th>
<th>Maximum 10 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factory set according to customer requirements</td>
</tr>
<tr>
<td>Pulse width</td>
<td>Selectable 1 kHz or 10 kHz symmetrical pulse</td>
</tr>
<tr>
<td></td>
<td>Factory set according to customer requirements</td>
</tr>
<tr>
<td>Connection</td>
<td>External voltage: $U_{\text{ext}} \leq 30 , \text{VDC} / \leq 24 , \text{VAC}$</td>
</tr>
<tr>
<td></td>
<td>Load rating: $I_{\text{max}} = 20 , \text{mA}$</td>
</tr>
</tbody>
</table>

Configuration

<table>
<thead>
<tr>
<th>Function</th>
<th>MODBUS connection for programming and configuration of full process parameters using software supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>MODBUS and pulse / frequency output can not be used simultaneously</td>
</tr>
<tr>
<td>Type</td>
<td>RS485 Modbus RTU</td>
</tr>
</tbody>
</table>

Approvals

<table>
<thead>
<tr>
<th>Mechanical</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electromagnetic compatibility (EMC)</td>
<td>Namur NE 21/9,95</td>
</tr>
<tr>
<td>CE</td>
<td>2004/108/EC (EMC)</td>
</tr>
<tr>
<td></td>
<td>2006/95/EC (Low Voltage Directive)</td>
</tr>
<tr>
<td>Hygienic</td>
<td>3A 28-03</td>
</tr>
<tr>
<td></td>
<td>ASME BPE 2005</td>
</tr>
<tr>
<td></td>
<td>Conforms with FDA guidelines</td>
</tr>
<tr>
<td></td>
<td>EHEDG</td>
</tr>
<tr>
<td>Vibration</td>
<td>IEC 60968-2-6</td>
</tr>
</tbody>
</table>
7.3 Measuring accuracy

The measuring error is obtained from the combined effects of accuracy and zero stability.

Reference conditions

<table>
<thead>
<tr>
<th>Product</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>+20°C / +68°F</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>1 barg / 14.5 psig</td>
</tr>
</tbody>
</table>
7.4 Pressure drop

**Metric**

<table>
<thead>
<tr>
<th>X: Mass flow [kg / min]</th>
<th>Y: Pressure [barg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

---

**Reference conditions**

<table>
<thead>
<tr>
<th>Meter</th>
<th>Product</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTIBATCH S08</td>
<td>Water</td>
<td>20°C</td>
</tr>
<tr>
<td>OPTIBATCH S10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTIBATCH S15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Imperial

<table>
<thead>
<tr>
<th>X Mass flow [lb / min]</th>
<th>Y Pressure [psig]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S08</td>
</tr>
<tr>
<td>2</td>
<td>S10</td>
</tr>
<tr>
<td>3</td>
<td>S15</td>
</tr>
</tbody>
</table>

#### Reference conditions

<table>
<thead>
<tr>
<th>Meter</th>
<th>Product</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTIBATCH S08</td>
<td>Water</td>
<td>68°F</td>
</tr>
<tr>
<td>OPTIBATCH S10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTIBATCH S15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.5 Dimensions and weights

7.5.1 Dimensions

**Hygienic flange**

<table>
<thead>
<tr>
<th>Meter</th>
<th>S08</th>
<th>S10</th>
<th>S15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>DN20 DIN11864-2</td>
<td>DN20 DIN11864-2</td>
<td>DN20 DIN11864-2</td>
</tr>
<tr>
<td></td>
<td>[mm]</td>
<td>[inches]</td>
<td>[mm]</td>
</tr>
<tr>
<td>A</td>
<td>15</td>
<td>0.59</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>270</td>
<td>10.6</td>
<td>270</td>
</tr>
<tr>
<td>C</td>
<td>112</td>
<td>4.4</td>
<td>112</td>
</tr>
<tr>
<td>D</td>
<td>189</td>
<td>7.44</td>
<td>189</td>
</tr>
<tr>
<td>E</td>
<td>59.5</td>
<td>2.34</td>
<td>59.5</td>
</tr>
</tbody>
</table>
### 7.5.2 Weights

<table>
<thead>
<tr>
<th>Meter</th>
<th>S08</th>
<th>S10</th>
<th>S15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[kg]</td>
<td>[lb]</td>
<td>[kg]</td>
</tr>
<tr>
<td></td>
<td>2.9</td>
<td>6.38</td>
<td>2.9</td>
</tr>
</tbody>
</table>