FLOWSIC600 Bio
Ultrasonic Gas Flow Meter for Biogas

Flow Metering for All Stages of Biogas Production

Sensor Intelligence.
FLOWSIC600 Bio and FLOWSIC600
Gas flow measurement for biogas production

**Areas of Application**

- Biogas production from agricultural waste, sludge digestion or landfills
- All process stages from fermentation to (possible) injection into natural gas grid or storage
- Typical gas compositions ranging between raw biogas and bio methane as equivalent to natural gas
- Dry or wet gases with or without highly corrosive contents (H₂S or other corrosive components)
- Low flow, low pressure applications (FLOWSIC600 Bio) as well as high pressure applications (FLOWSIC600)
- Process measurement in the production (FLOWSIC600 Bio) or fiscal measurement at line injection (FLOWSIC600)

**Ultrasound Measuring Principle**

Two ultrasonic transducers, which are installed at a defined angle to the flow axis, operate alternately as transmitter and receiver. The signals transmitted through the gas accelerate in the direction of flow and decelerate against the direction of flow. The resulting difference in transit times is used, along with geometric variables, to determine the average gas velocity. Calculation with the cross-sectional area yields the volumetric flow during operation. Measuring results are not affected by pressure, temperature, or gas composition. To increase the accuracy, the gas velocity is measured using multiple paths.

*Ultrasonic Technology in Biogas Production*

SICK ultrasound technology makes the measurement of biogas reliable and effective for your biogas plant. The sealed titanium transducers are build into a meter body made from low weight polyethylene (PE) or stainless steel – ideal materials for biogas environments.

**Key Features**

- Highly efficient titanium transducers
- Reliable operation even at atmospheric pressure
- Suitable for installation according to ATEX/IECEEx Zone 1 and Zone 2
- No pressure drop caused by installation
- Nearly maintenance free – no moving parts
- Bi-directional measurement for biogas storage
- Integrated real-time performance monitoring
- Data logs for hourly and daily historical data
GAS FLOW MEASUREMENT FOR BIOGAS PRODUCTION

Measurement of raw biogas under low pressure: FLOWSIC600 Bio

- Uncertainty of ±1.5% (depending on gas volume fraction and installation)
- Sealed titanium transducers
- Low weight PE meter body
- 2 ultrasonic measurement paths

RELIABLE PROCESS METER FOR RAW BIOGAS UNDER LOW PRESSURE

Measurement of purified (and possibly pressurized) biogas: FLOWSIC600 Bio (or FLOWSIC600)

- Uncertainty of ±0.2% for fiscal metering
- MID approval
- Steel or stainless steel meter body
- Sealed titanium transducers
- 4 ultrasonic measurement paths

FISCAL GAS FLOW METER FOR ALL PRESSURES AND ALL GASES
### Technical Data

#### FLOWSIC600 Bio

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Flow rate [m³/h]</th>
<th>Length [mm]</th>
<th>For Installation in PE piping (SDR 11)</th>
<th>For Installation in steel piping</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Inner diameter [mm]</td>
<td>Weight [kg]</td>
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<tr>
<td>DN 80</td>
<td>3&quot;</td>
<td>12</td>
<td>1,000</td>
<td>440</td>
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<tr>
<td>DN 100</td>
<td>4&quot;</td>
<td>20</td>
<td>1,600</td>
<td>450</td>
</tr>
<tr>
<td>DN 150</td>
<td>6&quot;</td>
<td>32</td>
<td>3,000</td>
<td>450</td>
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<tr>
<td>DN 200</td>
<td>8&quot;</td>
<td>40</td>
<td>4,500</td>
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</tr>
<tr>
<td>DN 250</td>
<td>10&quot;</td>
<td>50</td>
<td>7,000</td>
<td>500</td>
</tr>
<tr>
<td>DN 300</td>
<td>12&quot;</td>
<td>65</td>
<td>8,000</td>
<td>600</td>
</tr>
<tr>
<td>DN 400</td>
<td>16&quot;</td>
<td>120</td>
<td>14,000</td>
<td>800</td>
</tr>
</tbody>
</table>

- Meter body material: Polyethylene PE 100
- Flange connections: DIN EN 1092 Form B1 PN10

#### Measuring parameters

- Gases: Biogases wet or dry (45 ... 70% CH₄, 25 ... 55% CO₂ + trace gases like H₂S)
- Measured value: Volume flow (actual + standard), volume (actual + standard), gas velocity, speed of sound
- Design temperature: -20 °C ... +60 °C
- Pressure range: 0 barg ... 4 barg
- Repeatability: < 0.5 %
- Typical uncertainty: ± 1.5 %

#### Technical Data

#### FLOWSIC600

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<th>Flow rate [m³/h]</th>
<th>Length [mm]</th>
<th>Inner diameter [mm]</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50</td>
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<td>4</td>
<td>400</td>
<td>150</td>
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<tr>
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<td>8</td>
<td>1,000</td>
<td>240</td>
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<td>DN 100</td>
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<td>13</td>
<td>1,600</td>
<td>300</td>
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<td>DN 150</td>
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<tr>
<td>DN 250</td>
<td>10&quot;</td>
<td>50</td>
<td>7,000</td>
<td>750</td>
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<tr>
<td>DN 300</td>
<td>12&quot;</td>
<td>65</td>
<td>8,000</td>
<td>900</td>
</tr>
</tbody>
</table>

- Meter body material: Stainless steel, low temperature carbon steel, duplex steel

#### Measuring parameters

- Gases: Natural gas, process gases, biogas, air
- Measured value: Volume flow (actual and standard), volume (actual + standard), gas velocity, speed of sound
- Temperature: -40 °C ... +180 °C; -194 °C ... +280 °C on request
- Pressure range: 0 barg ... 250 barg; up to 450 barg on request
- Repeatability: < 0.5 %
- Typical uncertainty: 2 paths: ± 1.0 %
  4 paths: ± 0.5 % dry calibrated
  ± 0.2 % after flow calibration + adjustment with constant factor
  ± 0.1 % after flow calibration and with polynomial correction

#### Approvals, interfaces

**FLOWSIC600 Bio and FLOWSIC600**

<table>
<thead>
<tr>
<th>Approval</th>
<th>FLOWSIC600 Bio</th>
<th>FLOWSIC600</th>
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<tbody>
<tr>
<td>Ex certification</td>
<td>ATEX II 2G Ex de ib [ia] IIa T4</td>
<td>ATEX II 1/2G Ex de ib [ia] IIA or IIC T4</td>
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<tr>
<td>Pattern approval</td>
<td>-</td>
<td>MID, PTB, NMI, Measurement Canada, GOST</td>
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<tr>
<td>Electrical safety</td>
<td>CE, Enclosure rating: IP 65</td>
<td>CE, Enclosure rating: IP 65/IP 67</td>
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<tr>
<td>Outputs and interfaces</td>
<td>1x analog, 1x RS-485, 1x pulse, 2x status</td>
<td>Pulse, Status, RS485, (analog optionally)</td>
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</tbody>
</table>

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1) In dry gas, for Q max and installation with straight inlet/outlet section of 200D/3D.
2) Q max may be limited by working pressure and attenuation of the gas medium.
3) Within Q max with straight inlet/outlet section of 200D/3D or with flow straightener 100D/3D.
4) Within Q max with non disturbed inlet/outlet section of 100D/3D.