FLOWSIC600
Ultrasonic Gas Flow Meter

For Custody Transfer and Process Applications
FLOWSIC600
Gas flow measurement for process and custody applications

AREAS OF APPLICATION

- Fiscal metering
- Natural gas production, transportation, distribution and storage
- Onshore and offshore applications
- Dry, wet, corrosive and abrasive gases
- Process control
- Power plants, refineries and chemical industry
- Steam and cryogenic
- Process gases like N₂, O₂, H₂, CO₂, Cl₂ etc.
- Gases like sour gas or biogas with high H₂S content

<table>
<thead>
<tr>
<th>FLOWSIC600 2-PATH</th>
<th>FLOWSIC600 4-PATH</th>
<th>FLOWSIC600 2plet</th>
<th>FLOWSIC600 Quatro</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 path</td>
<td>4 path</td>
<td>4 + 1 path</td>
<td>4 + 4 path</td>
</tr>
<tr>
<td>2” ... 48”/DN50 ... DN1200</td>
<td>3” ... 48”/DN80 ... DN1200</td>
<td>3” ... 48”/DN80 ... DN1200</td>
<td>3” ... 48”/DN80 ... DN1200</td>
</tr>
<tr>
<td>Uncertainties of ±1%</td>
<td>Uncertainty of ±0.2%</td>
<td>Uncertainty of ±0.2%</td>
<td>Uncertainty of ±0.2%</td>
</tr>
<tr>
<td>Integrated performance monitoring</td>
<td>Integrated performance monitoring</td>
<td>CBM¹ by monitoring the installation close to the meter (contamination, blockage and pulsation)</td>
<td>2 independent fiscal meters in one meter body</td>
</tr>
</tbody>
</table>

¹) CBM ... Condition Based Maintenance

KEY FEATURES

- Integrated real-time performance monitoring
- New Software MEPAFLOW600 CBM¹
- 3 data logs (hourly, daily and weekly historical data)
- 3 logbooks (alarms, warnings and parameter changes)
- Highly efficient titanium transducers
- Nearly insensitive to regulator noise
- Operation even at atmospheric pressure
- Transducers extractable under line pressure
- Bi-directional measurement with no pressure drop
- Compact 3D design with direct path layout
- Rangeability greater than 100 : 1
- No damage from over-ranging

MEPAFLOW600 CBM supports commissioning, diagnosis, meter management and worldwide remote service.
The heart of an ultrasonic flow meter is the ultrasonic transducer. The sealed, titanium transducer design, and the working frequencies of 135 kHz, 210 kHz and 350 kHz, permit using the FLOWSIC600 in virtually all applications in gas flow metering – dry or wet, corrosive or ultrasonically noisy. This characteristics are complemented by a temperature range of −194 °C ... 280 °C (−317 °F ... 536 °F) and a pressure from 450 barg (6500 psig) down to ambient pressure.

The direct chordal path layout incorporates distinct advantages. Since the signals are not reflected inside the meter, contamination or changes in wall roughness do not effect the signal strength and signal quality. For this reason long term stability of measurement performance and highest accuracy is achieved. Due to the direct chordal path layout, together with the excellent transducer characteristics, the FLOWSIC600 has an enhanced immunity against control valve noise.
## FLOWSIC600 Technical Data

### Meter characteristics

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Flow rate [m³/h]</th>
<th>Flow rate [ft³/h]</th>
<th>Max. velocity</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>DN 50</td>
<td>6</td>
<td>400</td>
<td>210</td>
<td>14,000</td>
</tr>
<tr>
<td>DN 80</td>
<td>12</td>
<td>1,000</td>
<td>280</td>
<td>35,000</td>
</tr>
<tr>
<td>DN 100</td>
<td>20</td>
<td>1,600</td>
<td>460</td>
<td>57,000</td>
</tr>
<tr>
<td>DN 150</td>
<td>32</td>
<td>3,000</td>
<td>1,130</td>
<td>106,000</td>
</tr>
<tr>
<td>DN 200</td>
<td>40</td>
<td>4,500</td>
<td>1,410</td>
<td>159,000</td>
</tr>
<tr>
<td>DN 250</td>
<td>50</td>
<td>7,000</td>
<td>1,770</td>
<td>247,000</td>
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<tr>
<td>DN 300</td>
<td>12</td>
<td>8,000</td>
<td>2,300</td>
<td>283,000</td>
</tr>
<tr>
<td>DN 350</td>
<td>80</td>
<td>10,000</td>
<td>2,830</td>
<td>353,000</td>
</tr>
<tr>
<td>DN 400</td>
<td>120</td>
<td>14,000</td>
<td>4,240</td>
<td>494,000</td>
</tr>
<tr>
<td>DN 450</td>
<td>180</td>
<td>17,000</td>
<td>4,590</td>
<td>600,000</td>
</tr>
<tr>
<td>DN 500</td>
<td>200</td>
<td>20,000</td>
<td>7,060</td>
<td>706,000</td>
</tr>
<tr>
<td>DN 600</td>
<td>240</td>
<td>32,000</td>
<td>11,300</td>
<td>1,130,000</td>
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<tr>
<td>DN 700</td>
<td>280</td>
<td>40,000</td>
<td>22,950</td>
<td>1,413,000</td>
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<tr>
<td>DN 750</td>
<td>300</td>
<td>45,000</td>
<td>22,950</td>
<td>1,589,000</td>
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<tr>
<td>DN 800</td>
<td>320</td>
<td>50,000</td>
<td>28,250</td>
<td>1,766,000</td>
</tr>
<tr>
<td>DN 900</td>
<td>360</td>
<td>66,000</td>
<td>35,320</td>
<td>2,331,000</td>
</tr>
<tr>
<td>DN 1000</td>
<td>400</td>
<td>80,000</td>
<td>42,380</td>
<td>2,825,000</td>
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<tr>
<td>DN 1050</td>
<td>420</td>
<td>85,000</td>
<td>45,910</td>
<td>3,002,000</td>
</tr>
<tr>
<td>DN 1100</td>
<td>440</td>
<td>90,000</td>
<td>49,440</td>
<td>3,178,000</td>
</tr>
<tr>
<td>DN 1200</td>
<td>480</td>
<td>100,000</td>
<td>56,500</td>
<td>3,531,000</td>
</tr>
</tbody>
</table>

- **Meter body material**: Carbon steel 1.1120/A216WCC; 1.0420/A105
- **Carbon steel 1.1120/A216WCC; 1.0420/A105**
- **Stainless steel 1.4408/ASME A351 Gr. CF 8M**
- **Low temperature carbon steel 1.6220/A352; 1.0566/A350LF2**
- **Duplex steel 1.4470/ASME A995 Gr.4A/UNS J92205**

### Measuring parameters

- **Gases**: Natural gas, process gases, air
- **Measured value**: Volume flow (actual and standard), volume (actual and standard), velocity of gas, speed of sound
- **Temperature**: –40 °C ... +180 °C (–40 °F ... 365 °F); –194 °C ... +280 °C (–317 °F ... 536 °F) on request
- **Pressure range**: 0 barg ... 250 barg; up to 450 barg on request (0 ... 3600 psig; up to 6500 psig on request)
- **Repeatability**: < 0.1 %
- **Typical uncertainty**: 1 path: ± 2.0 % 2)
  2 paths: ± 1.0 % 2)
  4 paths: ± 0.5 % 3) dry calibrated
  ± 0.2 % 3) after flow calibration + adjustment with constant factor
  ± 0.1 % 3) after flow calibration and with polynomial correction

### Approvals

- **Ex certification**: ATEX: II 1/2G EEx de ib [ia] IIA or IIC T4
- **CSA**: Class I, Division 1, Groups D T4; Class I, Division 2, Groups D T4
- **Pattern approval**: MID, PTB, NMI, Measurement Canada, GOST, ...
- **Conformities**: OIML R137-1, OIML R11, A. G. A Report No. 9, API 21.1 (draft), ISO 17089-1 (draft)
- **Electrical safety**: CE
  - **Enclosure rating**: IP 65/IP 67

### Outputs and interfaces

- **Analog output**: Active/passive; optically isolated; 4 ... 20 mA; max. load = 250 Ω
- **Digital outputs**: Passive, optically isolated, open collector or according NAMUR, fmax = 6 kHz
- **Interfaces**: 2 x RS485
- **Bus protocol**: Modbus ASCII/Modbus RTU, HART protocol

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1) When the piping configuration 2 (with flow straightener plate) is used, the velocity of gas must not exceed 40 m/s (131 ft/s) in the pipe
2) Within Qmin ... Qmax with straight inlet/outlet section of 20D/3D or with flow straightener 10D/3D
3) Within Qmin ... Qmax with non disturbed inlet/outlet section of 10D/3D

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