Applications

Media: Natural gas, town gas, inert gases
Industries: Gas industry, furnace construction, chemicals industry
Tasks: Measurement, control, regulation

Brief information

Operating principle: Elster-Instromet IRM-3 and IRM-3 DUO rotary gas meters are volumetric measuring devices for gaseous media which operate according to the positive displacement principle. They record the operating volume. Electronic volume correctors can be used in order to correct the volume to the standard volume. IRM-3 DUO meters operate with two phase-shifted pairs of impellers which create two separate units of measurement. Pulsations are thereby eliminated, which are generated by conventional rotary gas meters. This leads to an extremely quiet, resonance-free and almost silent operation of these meters. The number of revolutions is proportional to the measured volume. The rotation is transferred to a mechanical index via a gear assembly and the volume is then recorded.

Conformity: IRM-3 DUO meters are designed, produced and tested in accordance with the following directives:
- EC Directive 2004/22/EC (MID)
- EC Directive 97/23/EC concerning pressure equipment (PED)
- EC Directive 94/9/EC concerning explosion protection (ATEX)

General: Rotary gas meters are characterised by a high measuring range and a compact design. Due to their measuring principle, they do not require a straight inlet or outlet pipe section. In order to guarantee long service life, the rotary gas meters are lubricated with oil. The standard double index allows the meter to be adapted to any flow direction.

Main features

- Meter sizes: G 400 – G 1000
- Flow rates from 6 to 1600 m³/h
- Nominal sizes DN 100 – DN 200
- Pressure ratings PN 10/16 and ANSI 150
- Temperature ranges:
  - MID: -25 °C to +55 °C
  - PED: -25 °C to +55 °C
  - ATEX: -20 °C to +55 °C
- Aluminium housing
- DUO principle for pulsation-free, resonance-free and low-noise operation
- Double index for universal installation and flow direction
- Optional: Absolute-ENCODER S1D
- Optional: Mechanical index drive
IRM-3 DUO: Rotary gas meters G 400 - G 1000

**Technical data**

<table>
<thead>
<tr>
<th>Operating pressure</th>
<th>Max. 16 bar</th>
</tr>
</thead>
</table>
| Protection class    | IP44: Meter with universal index, ventilated  
                      | IP65: Meter with universal index, closed  
                      | IP67: Meter with Absolute-ENCODER index SID |
| Housing             | Aluminium, piston made of Aluminium |
| Metrological approvals | PTB, domestic approval 7.131-99.14, NMi EEC E234-J, NMi MID T10198 |
| ATEX approval       | Ex II 2 Gc T6, according to ATEX directive 94/9/EC |
| Media               | Natural gas, town gas, inert gases; other gases on request |
| Max. error          | $Q_t = 0.2 \cdot Q_{max}$, for measuring range $\leq 1:20$  
                      | $Q_t = 0.15 \cdot Q_{max}$, for measuring range $> 1:30$  
                      | $Q_t = 0.1 \cdot Q_{max}$, for measuring range $= 1:50$  
                      | $Q_t = 0.05 \cdot Q_{max}$, for measuring range $> 1:50$ |
| Reproducibility     | < 0.1% |
| Applicable standards | OIML R137-1 (MID), ANSI B109.3 (PED), EN 13463-1 and 5 (ATEX) |
| Index variants      | Double index (standard)  
                      | Multi Index (option)  
                      | Absolute-ENCODER S1D (option) |
| Outputs             | - 2 LF pulse generators (reed contact)  
                      | - 1 HF pulse generator (option), not possible with integrated Absolute-ENCODER index S1D  
                      | (direct mounting on housing cover) |
| Pressure/temperature tapping | 2 pressure tappings 1/4" NPT, 2 thermowells standard |

**Measuring ranges according to PTB approval**

<table>
<thead>
<tr>
<th>Size</th>
<th>Nominal diameter</th>
<th>Measuring range national</th>
<th>Measuring volume dm³</th>
<th>Measuring range national</th>
<th>Measuring volume dm³</th>
<th>Measuring range national</th>
<th>Measuring volume dm³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Q_min [m³/h]</td>
<td>Q_max [m³/h]</td>
<td>DUO</td>
<td>HF* [imp/m³]</td>
<td></td>
<td>Q_min [m³/h]</td>
</tr>
<tr>
<td>G 400</td>
<td>100/150</td>
<td>1 : 100</td>
<td>6</td>
<td>32.0</td>
<td>650</td>
<td>5.530</td>
<td>720</td>
</tr>
<tr>
<td>G 650</td>
<td>150</td>
<td>1 : 160</td>
<td>6</td>
<td>50.0</td>
<td>1000</td>
<td>8.849</td>
<td>450</td>
</tr>
<tr>
<td>G 1000</td>
<td>200</td>
<td>1 : 160</td>
<td>10.0</td>
<td>80.0</td>
<td>1600</td>
<td>14.180</td>
<td>282</td>
</tr>
</tbody>
</table>

* Stated HF pulse values nominal, specific values may differ

**Universal index**

Flow direction: left - right  
respectively. top - bottom

Flow direction: right - left  
respectively. bottom - top
**DUO principle**

The meters of sizes G 400 - G 1000 have two phase-shifted pairs of impellers (DUO), which form two separate units of measurement. The pulsations of both measurement units eliminate each other. The result is an extremely quiet operation without resonance and pulsations. The resulting additional enhanced measurement characteristic allows the use of these meters as a test rig master meter with a high measuring range.

**IRM 3 DUO G 1000 version**

The IRM-3 DUO G 1000 DN200 is adapted to DN200 using the appropriate fittings.

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**Absolute-ENCODER index S1D**

- Electronically readable mechanical double index
- PTB and ATEX approval
- Various data interfaces available

Detailed information can be found on the data sheet “Absolute-ENCODER S1”
Dimensions and Weights

<table>
<thead>
<tr>
<th>Size</th>
<th>Nominal diameter</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 400</td>
<td>100/150</td>
<td>466</td>
<td>241/260</td>
<td>308</td>
<td>270</td>
<td>196</td>
<td>46/50</td>
<td></td>
</tr>
<tr>
<td>G 650</td>
<td>150</td>
<td>598</td>
<td>260</td>
<td>308</td>
<td>336</td>
<td>262</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>G 1000</td>
<td>200</td>
<td>810</td>
<td>600</td>
<td>340</td>
<td>442</td>
<td>368</td>
<td>113</td>
<td></td>
</tr>
</tbody>
</table>

Pressure loss

The pressure loss values refer to natural gas (0.8 kg/m³) at atmospheric pressure.
When using natural gas at higher operating pressures, these values must be multiplied by the absolute pressure (in bar).

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