# DATASHEET M13

## mini CORI-FLOW™ M13

Low Flow Coriolis Mass Flow Meter


### Low Flow Coriolis Mass Flow Meters for Liquid and Gases

mini CORI-FLOW™ Mass Flow Meters and Controllers are precise and compact instruments, based on the Coriolis measuring principle, designed to cover the needs of the low flow market. Bronkhorst® model M13 Mass Flow Meter (MFM) is suited for highly accurate measurement of gas or liquid flow in the range of 0…2000 g/h (which corresponds with 0…26,6 $l_n$/min when used on nitrogen) at operating pressures up to 200 bar (higher on request). The instruments are equipped with a robust IP65 weatherproof housing and are optionally available with ATEX approval for use in Zone 2 hazardous areas.

The instrument contains a microprocessor based pc-board with signal and fieldbus conversion and a PID controller for optional mass flow control by means of a separately mounted control valve or pump.

### Technical specifications

**Measurement / control system**

| | |
|---|---|
| Flow rates | Liquid: 0…2000 g/h (nominal flow rate: 1000 g/h);<br>Gas: 0...26,6 $l_n$/min ($N_2$);<br>Full Scale (FS) value is user-configurable |
| Mass flow accuracy | Liquid: ± 0,2% Rd;<br>Gas: ± 0,5% Rd |
| Repeatability | ± 0,05 % of rate ± ½(ZS* x 100/actual flow)% |
| Turndown ratio | up to 1:100 |
| Zero stability (ZS) | < ± 0,2 g/h<br>(Guaranteed at constant temperature and for unchanging process and environment conditions.) |
| Response time (sensor) | ≤ 200 msec |
| Temperature effect | on zero: < 0,02 g/h/°C;<br>on span: < 0,001% Rd/°C;<br>self heating (at zero flow): < 15°C<br>(Depends on flow rate, heat capacity fluid, T amb., T fluid and cooling capacity.) |
| Operating temperature | 0 … 70 °C ;<br>for ATEX Cat.3, Zone 2 max. 50°C |
| Mounting | any position, attitude sensitivity negligible.<br>Instrument to be rigidly bolted to a stiff and heavy mass or construction for guaranteed zero stability.<br>External shocks or vibrations should be avoided. |
| Temperature accuracy | ± 0,5 °C |
| Density accuracy | < ± 5 kg/m³ (at full scale flow) |
| Leak integrity, outboard | tested < 2 x $10^{-9}$ mbar l/s He |

**Measurement / control system**

| | |
|---|---|
| Warm-up time | > 30 min for optimum accuracy |

**Mechanical parts**

| | |
|---|---|
| Sensor | single tube, DN 0.5 |
| Material (wetted parts) | stainless steel 316L or comparable;<br>optional: Hastelloy-C22 |
| Housing | stainless steel 430F |
| Pressure rating (PN) | 200 bar abs , higher on request |
| Process connections | compression type or face seal (VCR/VCO) couplings, or Tri-Clamp flanges (welded) |
| Seals | metal |
| Weight | 1,1 kg |
| Ingress protection | IP65 (weatherproof) |

**Electrical properties**

| | |
|---|---|
| Power supply | +15…24 Vdc +/- 10%<br>Max. ripple recommended: 50 mV tt |
| Max. power consumption | max. 3 W |
| Analog output | 0…5 (10) Vdc, min. load impedance > 2 kΩ;<br>0 (4)…20 mA (sourcing), max. load impedance < 375 Ω |
| Analog setpoint | 0…5 (10) Vdc, min. load impedance > 100 kΩ;<br>0 (4)…20 mA (sourcing), max. load impedance ~ 250 Ω |
| Digital communication | standard: RS232;<br>options: PROFIBUS DP, DeviceNet™, Modbus RTU or FLOW-BUS |

**Electrical connection**

| | |
|---|---|
| Analog/RS232 | 8-pin DIN (male); |
| PROFIBUS DP | bus: 5-pin M12 (female);<br>power: 8-pin DIN (male); |
| CANopen® / DeviceNet™ | 5-pin M12 (male); |
| FLOW-BUS/Modbus-RTU/ASCII | 5-pin M12 (male); |

**Control valve options**

**External actuator options to be connected to the controller**

**Certification for hazardous areas**

**Approvals / certificates**

Technical specifications subject to change without notice.

*For dimensional drawings and hook-up diagrams please visit the product page on our website*

## Recommended accessories

### E-8000 SERIES

**Digital Readout / Control Systems**

- Bright, wide angle, 1.8" display (TFT technology)
- User friendly operation, menu driven with 4 push buttons


### BRIGHT SERIES

**Compact Local R/C Module**

- Bright, wide angle, 1.8" display
- User friendly operation
- Indication/operation/configuration

### PIPS SERIES

**Plug-in Power Supply**

- For lab-style or industrial devices
- Interchangeable plugs (Euro, UK, USA, Australian, IEC) for mains connection

### MOUNTING PARTS

**Mass blocks and vibration dampeners**

- To guarantee zero stability of low flow Coriolis instruments

## Related products


### MINI CORI-FLOW™ M13V14I

- Flow range 0…2000 g/h
- Pressure rating 100 bar
- Independent of fluid properties
- High accuracy, fast control

### MINI CORI-FLOW EX D XM13

- Flow range 0…2000 g/h
- Pressure rating 138 bar
- IECEx and ATEX Zone 1 approved
- Independent of fluid properties


### MINI CORI-FLOW™ M12

- Flow range 0…200 g/h
- Pressure rating 200 bar
- Independent of fluid properties
- High accuracy, fast response


### MINI CORI-FLOW™ MI130

- Flow range 0…2000 g/h
- Pressure rating 200 bar
- Independent of fluid properties
- IP66/IP67 housing, terminal strip conn.

Bronkhorst®

www.bronkhorst.com

Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!