

# 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<sub>n</sub>/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); Gas: 0...26,6 l <sub>n</sub> /min (N <sub>2</sub> ); Full Scale (FS) value is user-configurable
Mass flow accuracy	Liquid: ± 0,2% Rd; 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 (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; on span: < 0,001% Rd/°C; self heating (at zero flow): < 15°C (Depends on flow rate, heat capacity fluid, T amb., T fluid and cooling capacity.)
Operating temperature	0 ... 70 °C; for ATEX Cat.3, Zone 2 max. 50°C
Mounting	any position, attitude sensitivity negligible. Instrument to be rigidly bolted to a stiff and heavy mass or construction for guaranteed zero stability. External shocks or vibrations should be avoided.
Temperature accuracy	± 0,5 °C
Density accuracy	< ± 5 kg/m <sup>3</sup> (at full scale flow)
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He

## Measurement / control system

Warm-up time	> 30 min for optimum accuracy
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## Mechanical parts

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

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

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