

# M13

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## mini CORI-FLOW™ M13

### Low Flow Coriolis Mass Flow Meter

- High accuracy, excellent repeatability
- Fast response
- Independent of fluid properties
- Additional density and temperature output
- Compact, rugged (IP65) design
- Optional ATEX approval Cat.3, Zone 2



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## 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 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.

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## 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% of rate; Gas: ± 0,5% of rate
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>
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He
Warm-up time	> 30 min for optimum accuracy

## Mechanical parts

Sensor	single tube, DN 0.5
Material (wetted parts)	stainless steel 316L or comparable; 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% Max. ripple recommended: 50 mV tt
Max. power consumption	max. 3 W
Analog output	0...5 (10) Vdc, min. load impedance > 2 kΩ; 0 (4)...20 mA (sourcing), max. load impedance < 375 Ω
Analog setpoint	0...5 (10) Vdc, min. load impedance > 100 kΩ; 0 (4)...20 mA (sourcing), max. load impedance ~ 250 Ω
Digital communication	standard: RS232; options: PROFIBUS DP, DeviceNet™, Modbus RTU or FLOW-BUS

## Electrical connection

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

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™ M13V141**

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™ M14**

Flow range 0...30 kg/h  
Pressure rating 200 bar  
Independent of fluid properties  
High accuracy, fast response



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