

DATASHEET MI140

mini CORI-FLOW™ MI140

Low Flow Coriolis Mass Flow Meter / Controller



Low Flow Coriolis Mass Flow Meters / Controllers for Liquid and Gases

mini CORI-FLOW™ MI-series Mass Flow Meters and Controllers are precise, versatile and compact instruments, based on the [Coriolis measuring principle](#), featuring fast response and designed to cover the needs of the low flow market. Bronkhorst® model MI140 Mass Flow Meter (MFM) is suited for highly accurate measurement of gas or liquid flow ranges up to 30 kg/h (which corresponds 400 l_n/min when used on nitrogen) at operating pressures up to 200 bar. The instruments are equipped with a robust IP66/IP67 weatherproof housing with screw terminal connections. The MI-series MkII are suitable for an industrial area up to pollution degree 3 with additional gas or dust (Ex) atmosphere (zone 2/22 or EPL Gc/Dc).

The instrument contains smart electronics, featuring alarm and counter functions, and a PID controller for optional mass flow control by means of a separately mounted control valve or pump. With regard to connectivity, the instruments can be equipped with a wide range of fieldbus options, beside their standard analog and RS232 I/O communication.

Technical specifications

Measurement / control system

Flow rates	Liquid: 0...30 kg/h (nominal flow rate: 10 kg/h); Gas: 0...400 l _n /min (N ₂); Full Scale (FS) value user-configurable
Mass flow accuracy	Liquid: ≤±0,2% Rd (of Reading); Gas: ≤±0,5% Rd
Volume flow accuracy	Liquid: ≤ ±0,2% Rd, at fixed density value; Gas: ≤ ±0,5% Rd
Repeatability	Liquid mass flow: ≤ ±0,05% Rd ± ½ZS (Zero Stability); Gas mass flow: ≤ ±0,25% Rd ± ½ZS; Density: ≤ ±1 kg/m ³ (at calibration conditions at stable flow)
Turndown ratio	up to 1:1000 (in digital mode)
Zero stability (ZS)	< ± 6 g/h (Guaranteed at constant temperature and for unchanging process and environment conditions.)
Response time (sensor)	≤ 200 msec
Fluid temperature	-20 ... +70 °C
Ambient temperature	-20 ... +70 °C
Mounting	any position, attitude sensitivity negligible. External shocks or vibrations should be avoided.
Temperature sensitivity	≤ 0,5 g/h/°C
Temperature accuracy	± 0,5 °C

Measurement / control system

Density accuracy	< ± 1 kg/m ³ (at calibration conditions at stable flow), up to 2500 kg/m ³
Max. fluid viscosity	5000 cP
Leak integrity, outboard	tested < 2 x 10 ⁻⁹ mbar l/s He
Warm-up time	> 30 min for optimum accuracy

Mechanical parts

Sensor	single tube, DN 1.14, Ra ≤0,8 µm
Material (wetted parts)	stainless steel 316L / 1.4404
Housing	stainless steel 316L / 1.4404 (body); high-grade anodised aluminium alloy (EN AW-6082-T6, AISI1MgMn, housing and lid); FKM (sealings)
Pressure rating (PN)	200 bar abs
Process connections	compression type or face seal (VCR/VCO) couplings, or Tri-Clamp flanges (welded)
Seals	none (in fluid path)
Weight	5 kg
Ingress protection	IP66/IP67

Electrical properties

Power supply	+15...24 Vdc +/- 10% Max. ripple recommended: 50 mV tt
Max. power consumption	meter: max. 3 W; controller: max 7 W
Analog output	0...5 (10) Vdc, min. load impedance > 2 kΩ; 0 (4)...20 mA (sourcing), regular, max. load impedance < 375 Ω; with HART, load impedance 250...600 Ω
Analog setpoint	(for MFM + pump or control valve) 0...5 (10) Vdc, min. load impedance > 100 kΩ 0 (4)...20 mA (sourcing), max. load impedance ~ 250 Ω
Digital communication	standard: RS232; options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK, FLOW-BUS or HART
Valve control signal	M12 cable gland, screw terminals <2,5 mm ²
Bus termination	dipswitch integrated on pc-board
Support interface	micro USB on pc-board

Electrical connection

Analog/RS232	M20 gland : I/O signals and Power M12 gland : Actuator output M12 gland : Bronkhorst valve out
PROFIBUS DP	M20 gland
CANopen® / DeviceNet™	M20 gland
FLOW-BUS/Modbus-RTU/ASCII	M20 gland
Modbus TCP / EtherNet/IP / POWERLINK	M20 gland

Electrical connection

EtherCAT®/ PROFINET	M20 gland
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Control valve options

External actuator options to be connected to the controller

Certification for hazardous areas

Approvals / certificates

Hazardous areas	ATEX / IECEx / UKEx category 3, zone 2/22 hazardous areas (only for MkII) Ex II 3G Ex ec IIC T4 Gc (gas) Ex II 3D Ex tc IIIC T100 °C Dc (dust)
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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

Related products



MINI CORI-FLOW™ M14

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



MINI CORI-FLOW™ M130

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



MINI CORI-FLOW™ M15

Flow range 0...300 kg/h
Pressure rating 100 bar
Independent of fluid properties
High accuracy, fast response