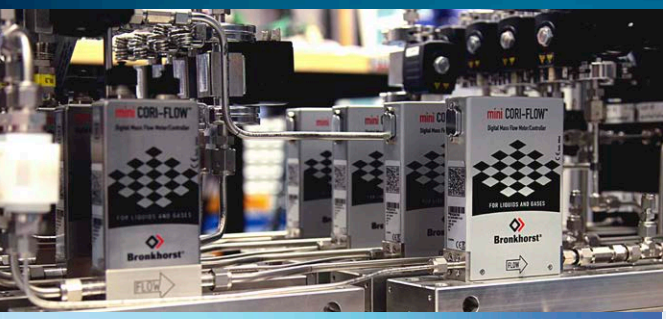
mini CORI-FLOW™

Low Flow Coriolis Mass Flow Meters and Controllers for liquids and gases

Bronkhorst®

Coriolis mass flow meters and controllers



mini CORI-FLOW™ series by Bronkhorst® are precise and compact Mass Flow Meters and Controllers, based on the Coriolis measuring principle. Designed to cover the needs of the low flow market, there are various models to overlap flow ranges from 0,1 g/h up to 300 kg/h, each offering "multi-range" functionality: factory calibrated ranges can be rescaled by the user, maintaining the original accuracy specs. As a result of this, customers are able to reduce the variety of instruments and thus reduce the cost of ownership.

Depending on their application, the instruments may be equipped with laboratory style housing or a robust industrial housing with optional ATEX approval for use in Zone 2 hazardous areas. The new (MkII) MI-series 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). mini CORI-FLOW™ Ex D instruments are built in an explosion proof housing for use in IECEx and ATEX Zone 1 hazardous areas, ATEX approval II 2 G Ex d e IIB T6 Gb.

Mini CORI-FLOW features

- Lowest flow rates available on the market (based on Coriolis measuring principle)
- High accuracy, excellent repeatability
- Integrated PID for fast and stable control
- Direct mass flow measurement, independent of fluid properties
- Additional density and temperature output
- Compact, space saving design
- Small internal volume

Fields of application

mini CORI-FLOW™ instruments can be applied for both gases and liquids in process fluid measurement or control systems. Typical fields of applications are:

- Analytical systems
- Dosing of additives in food, beverage and pharmaceutical industries
- (Petro-) chemical installations
- Pilot plants
- CVD/Coating systems
- Semiconductor processing

SUPERIOR CORIOLIS FLOW SENSOR

Instruments of the mini CORI-FLOW™ series contain a uniquely shaped, single loop sensor tube, forming part of an oscillating system. When a fluid flows through the tube, Coriolis forces cause a variable phase shift, which is detected by sensors and fed into the integrally mounted pc-board. The resulting output signal is strictly proportional to the real mass flow rate. Coriolis mass flow measurement is fast, accurate and inherently bi-directional. The mini CORI-FLOW™ features density and temperature of the fluid as secondary outputs.

COMPACT FLOW CONTROL USING VALVES OR PUMPS

Contrary to many other Coriolis flow meters on the market, mini CORI-FLOW™ offers integrated PID control and close-coupled control valves or pumps, thus constituting very compact, cost- and space-saving, precise Coriolis Mass Flow Controllers.

IMPROVED DOSING APPLICATIONS USING CORIOLIS INSTRUMENTS WITH FLUIFILL® TECHNOLOGY

FLUIFILL® technology features an integrated batch counter function together with the facility to directly control shut-off valves, proportional valves or (gear) pumps. Due to this technology, Bronkhorst can offer compact assemblies of (mini) CORI-FLOW™ instruments combined with a valve or pump, capable of dosing the exact desired amount of fluid. FLUIFILL® technology supports our low flow Coriolis instruments to perform fast, repetitive dosing and filling tasks for precursors, additives, solvents, etc.

ANALOG AND DIGITAL INTERFACE

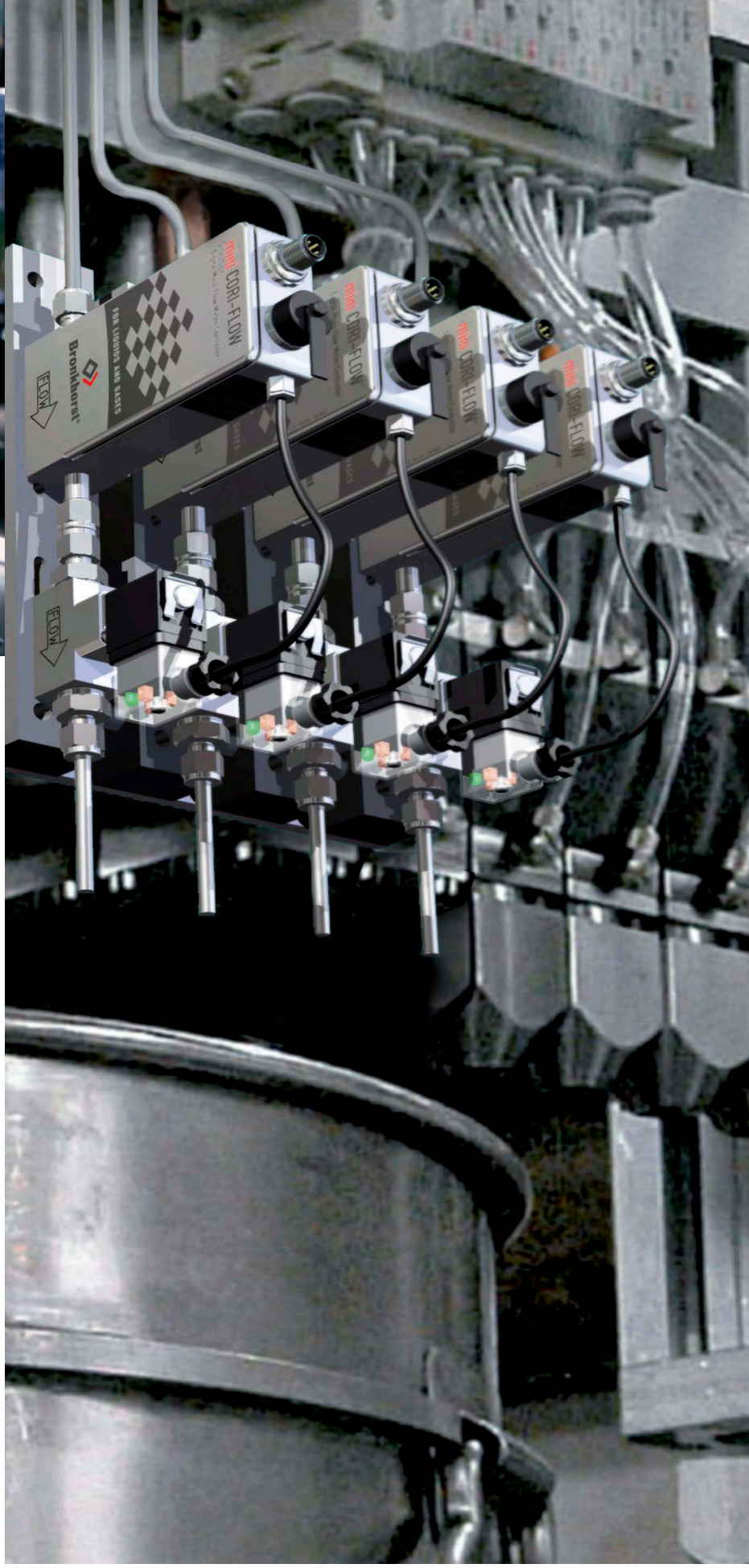
mini CORI-FLOW™ features state-of-the-art digital technology, offering fieldbus interface options and additional functions such as totalisation and alarms. The instruments can be tuned according to customer requirements using the RS232/fieldbus interface and a number of free to use software tools. Customers may select analogue I/O signals (0-5 Vdc / 0-10 Vdc / 0-20 mA / 4-20 mA) or digital communication via RS232 or optional, on-board fieldbus interface to PROFIBUS DP, DeviceNet, Modbus RTU/ASCII or FLOW-BUS. ML120 series can also be equipped with EtherCAT or PROFINET interface.

Available models

	Model	Flow rates	Pressure Rating	Protection Class
	**ML120V00** **Mass Flow Meter**	Min. 0,05…5 g/h Max. 2…200 g/h	200 bar	IP40
	ML120V21 **Mass Flow Controller**	Min. 0,05…5 g/h Max. 2…200 g/h	5 bar	IP40
	**M12** **Mass Flow Meter**	Min. 0,1…5 g/h Max. 2…200 g/h	200 bar	IP65; Option: ATEX Zone 2
	M13 **Mass Flow Meter**	Min. 1…50 g/h Max. 20…2000 g/h	200 bar	IP65; Option: ATEX Zone 2
	M14 **Mass Flow Meter**	Min. 0,03…1 kg/h Max. 0,3…30 kg/h	200 bar	IP65; Option: ATEX Zone 2
	**M12V14I (Liquid) /** **M12V01I / M12V11I (Gas)** **Mass Flow Controller**	Min. 0,1…5 g/h Max. 2…200 g/h	100 bar	IP65; Option: ATEX Zone 2
	M13V14I (Liquid) / **M13V01I / M13V11I (Gas)** **Mass Flow Controller**	Min. 1…50 g/h Max. 20…2000 g/h	100 bar	IP65; Option: ATEX Zone 2
	M14V14I (Liquid) / **M14V01I / M14V11I (Gas)** **Mass Flow Controller**	Min. 0,03…1 kg/h Max. 0,3…30 kg/h	100 bar	IP65; Option: ATEX Zone 2
	**MI1x0** **Mass Flow Meter** **(control options on request)**	Min. 0…2000 g/h Max. 0…30 kg/h	200 bar	IP66/IP67; 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)
	**M15** **Mass Flow Meter**	Min. 0,2…5 kg/h Max. 3…300 kg/h	100 bar	IP65; Option: ATEX Zone 2

Available models

	Model	Flow rates	Pressure Rating	Protection Class
	**M15 Mass Flow Meter + various Bronkhorst® control valve options**	Min. 0,2…5 kg/h Max. 3…300 kg/h	Up to 100 bar	IP65; Option: ATEX Zone 2
	**XM12 Mass Flow Meter (control options on request)**	Min. 0,1…5 g/h Max. 2…200 g/h	138 bar	IECEx and ATEX Zone 1 hazardous areas ATEX approval II 2 G Ex d e IIB T6 Gb
	XM13 Mass Flow Meter (control options on request)	Min. 1…50 g/h Max. 20…2000 g/h	138 bar	IECEx and ATEX Zone 1 hazardous areas ATEX approval II 2 G Ex d e IIB T6 Gb
	XM14 Mass Flow Meter (control options on request)	Min. 0,03…1 kg/h Max. 0,3…30 kg/h	107 bar	IECEx and ATEX Zone 1 hazardous areas ATEX approval II 2 G Ex d e IIB T6 Gb
	**All above mentioned flow meters can be combined with shut-off valves for very fast and accurate batch dosing applications.**	Min. 0,05…5 g/h Max. 3…300 kg/h	Up to 200 bar	Depending on application
	**All above mentioned flow meters can be combined with various, close-coupled pumps.**	Min. 0,05…5 g/h Max. 3…300 kg/h	Up to 200 bar	Depending on application
	**All above mentioned flow meters can be combined with various, close-coupled third-party control valves.**	Min. 0,05…5 g/h Max. 3…300 kg/h	Up to 200 bar	Depending on application



Further options

In addition to the great variety of control options using an extensive range of control valves and pumps, Bronkhorst offers many solutions for specific applications, for example:

- Alternatives for stainless steel parts, e.g. Hastelloy-C22
- Flow ranges >300 kg/h
- Pressure ratings >200 bar
- Operating temperatures >70°C
- Close-coupled shut-off valves and/or particle filters
- Integration of multiple instruments and/or components (display, PLC, protected housing, mounting skid, etc.) in a customised, plug & perform subsystem

Accessories

In order to guarantee the zero stability, (ultra) low flow Coriolis instruments need to be rigidly bolted to a stiff and heavy mass or construction. For customer convenience, Bronkhorst offers a variety of **mounting parts**, e.g. mounting blocks and vibration dampeners.
Furthermore, Bronkhorst offers various solutions for **powering, readout and control** of their Mass Flow Meters and Controllers, e.g. BRIGHT series local Readout/Control series and E-8000 series advanced digital PS/Readouts, both single- and multi-channel configurations.
Last but not least, Bronkhorst offers **software support**, free of charge for users of digital Bronkhorst® instruments, suitable for operation by personal computer, a LABVIEW driver and online, interactive calculation and sizing tools.