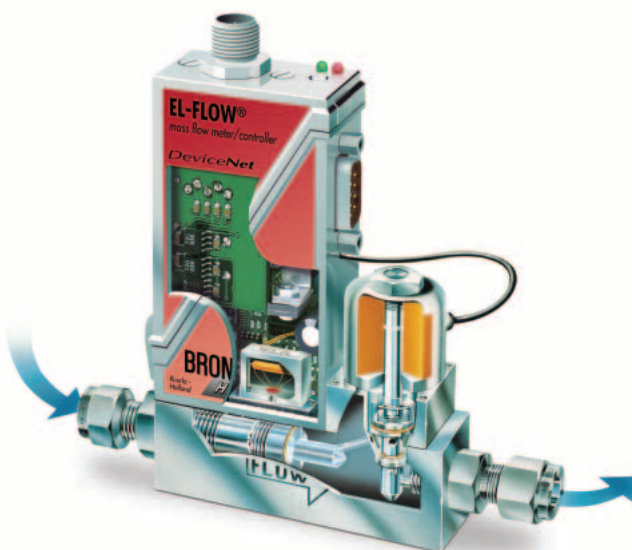


MASS FLOW AND PRESSURE MEASUREMENT AND CONTROL

GENERAL

Bronkhorst High-Tech B.V. was established in 1981 and now offers the most extensive product range of thermal mass flow meters and controllers on the market. Numerous styles of both standard and customized instruments can be offered for applications in laboratory, industrial and hazardous areas. The full scale measuring range (with 50:1 turn-down) for these instruments can be selected between 0...1 sccm and 0...11000 m³/h for gases and 0...30 mg/h up to 0...20 kg/h for liquids. Furthermore Bronkhorst High-Tech offers pressure transducers and controllers with a minimum range of 0...100 mbar and a maximum range of 0...400 bar. The most recent development is a Coriolis Mass Flow Controller for gases and liquids with measurement capability between 20 g/h and 600 kg/h. Customer satisfaction, innovation and quality of product and service have been the cornerstones of Bronkhorst High-Tech's success. In this leaflet Bronkhorst High-Tech briefly describes the various product lines. On request a technical brochure of each product will be submitted.



EL-FLOW® F-201C Digital MFC

EL-FLOW® SERIES

Mass Flow Meters and Controllers for gas applications with an electronic housing suitable for laboratory conditions. EL-FLOW® series instruments are truly unique in their capability to control flow ranges between 0...1 sccm and 0...1250 SLM with pressure rating ranging between vacuum and 400 bar – all in one range of instruments. This versatility in flow ranges and in operating conditions has ensured that the EL-FLOW® Series remains our most popular and our most field proven of instruments.

Features:

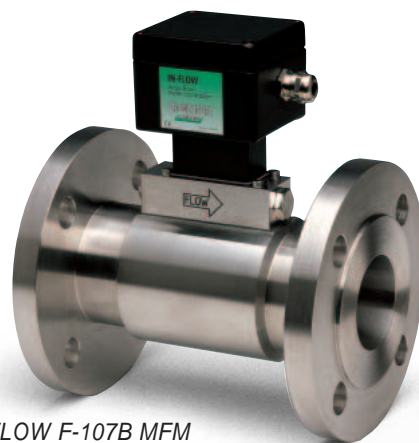
- no moving parts
- fast response
- no need for temperature or pressure measurement
- best accuracy: $\pm 0,5\%$ of reading + $\pm 0,1\%$ of F.S.
- both analog and digital versions available

- Flow ranges:
- smallest 0...1 sccm
 - highest 0...1250 SLM

IN-FLOW SERIES

IN-FLOW Series Mass Flow Meters/Controllers are thermal mass flow meters for gas applications requiring a rugged design and suitability for industrial environments. The electronics housing is rated to IP-65 and output signals can be offered via either an analog or a digital pc-board. There are three different styles available, viz. for installation in a process line by means of:

- compression type couplings for 0...15 sccm up to 0...1250 SLM
- wafer type connection for 0...10 up to 0...11000 m³/h
- flanged type connection for 0...10 up to 0...1800 m³/h



IN-FLOW F-107B MFM



LOW- Δ P-FLOW SERIES

LOW- Δ P-FLOW Series Mass Flow Meters and Controllers are derived from the EL-FLOW series. The special construction of both sensor and flow restriction makes this series suitable for low pressure drop applications (the sensor only requires 0,5 to 5 mbar). Furthermore the larger flow channels minimize the risks of clogging and facilitate the cleaning and purging of these LOW- Δ P-FLOW instruments.

Features:

- very low pressure drop
- suitable for corrosive gases
- no moving parts
- all stainless steel construction
- also available with IN-FLOW industrial housing
- both analog and digital versions available

Flow ranges: • smallest 0...10 sccm
• highest 0...200 m³/h



LOW- Δ P-FLOW F-101D MFM



COMBI-FLOW SERIES

The COMBI-FLOW mass flow and pressure meter/controller has been designed for the advanced semiconductor market. The design is modular and the mass flow/pressure control functions can be combined with filtering and shut-off modules.

Features

- Ultraclean
- Metal sealed
- Electropolished
- Orbitally welded
- Cleanroom assembled

EL-PRESS SERIES

The EL-PRESS Series electronic pressure meters and controllers have a well-proven compact thru-flow design and are available in pressure ranges for 0...100 mbar up to 0...400 bar. A differential pressure transmitter can also be supplied in the range of 0...15 bara. The pressure controller performs with high accuracy and repeatability and should be specified for forward pressure control (P-600 series) or backward pressure control (P-700 series).

Pressure ranges: • smallest 0...100 mbar
• highest 0...400 bar



EL-PRESS P-702C EPC

LIQUI-FLOW® SERIES

Mass Flow Meters and Controllers for liquids in ranges between 0...5 g/h and 0...20 kg/h (water equivalent). LIQUI-FLOW® flow meters only require a small differential pressure. Despite utilizing direct measurement (i.e. without a by-pass) the temperature rise of the fluid is minimal; only approx. 1...5 °C. This greatly limits the danger of evaporation or degradation of the fluid.

Features:

- Fast and accurate measuring signal
- Single rail power supply +15 V or +24 V
- Both analog (models L1/L2/L30) and digital (models L10/L20) versions available
- Thru-flow measurement (no by-pass)
- Insensitive to mounting position

Flow ranges: • smallest 0...5 g/h
 • highest 0...20 kg/h



LIQUI-FLOW L10V02 MFC



µ-FLOW L01 MFM

µ-FLOW SERIES

For ultra low flow ranges of liquids Bronkhorst High-Tech developed the µ-FLOW series for 0...250 mg/h up to 0...2 g/h water equivalent. These thermal mass flow meters can be close-coupled to a LIQUI-FLOW® control valve, as described in this brochure, for pulsation-free control of the above mentioned flow ranges. The latest design of the µ-FLOW liquid flow meter can be equipped with a digital pc-board and can be downscaled to 500 nanolitres per minute.

Flow ranges: • smallest 0...30 mg/h
 • highest 0...2 g/h

EX-LIQUI-FLOW SERIES

For applications in hazardous areas, our LIQUI-FLOW meters (models L1 and L2) described in this leaflet can be converted to Ex-proof instruments by mounting them in a flameproof housing with ATEX approval according to II 2 G EEx de IIC. The models XL1 and XL2 can be coupled to a control valve with coil classification II 2 G/D IP6X T130°C EEx me T4.

Flow ranges: • smallest 0...5 g/h
 • highest 0...1000 g/h

EX-FLOW SERIES

EX-FLOW Series Mass Flow Meters/Controllers are thermal mass flow meters/controllers for gas applications requiring rugged design and suitability for hazardous areas. The electronics housing is rated to IP-65 and approved according to ATEX with the classification II 2 G EEx ib IIC T4.

Flow ranges: • smallest 0...10 sccm
 • highest 0...11000 m³s/h



CORI-FLOW® SERIES

For liquid flow ranges up to 0...600 kg/hour Bronkhorst High-Tech designed a new series mass flow metering instruments, offering high accuracy (up to $\pm 0,1$ % FS plus $\pm 0,2\%$ of Reading). CORI-FLOW® utilizes a patented, advanced Coriolis type mass flow sensor to achieve unsurpassed performance, even with changing operation conditions in pressure, temperature, density, conductivity and viscosity. CORI-FLOW® is offered with or without an integral control valve but with both analog and digital communications (including RS-232, Profibus-DP®, DeviceNet™, Modbus or FLOW-BUS). The M50 series can also be applied for gases.

Flow ranges: • smallest 0...200 g/h
• highest 0...600 kg/h

Features

- Direct mass flow measurement
- Fast response time
- High accuracy
- IP-65 housing
- Analog plus digital communication



CORI-FLOW® M50 MFM



3-CHANNEL E-7000 PS/READOUT

CEM SYSTEM

The CEM-System (Controlled Evaporation and Mixing) is an innovative Liquid Delivery System that can replace traditional Bubbler Systems. It consists of a liquid flow controller, an MFC for carrier gas and a temperature controlled mixing and evaporation device. The system is suitable for mixing liquid flows of 0.25...1000 g/h resulting in saturated vapor flows of 5 sccm to 20 SLM.

POWER SUPPLY/READOUT SYSTEMS

Bronkhorst High-Tech B.V. offers various readout systems for powering mass flow meters/controllers:

- E-5700 Standard analog PS/Readouts, standard, economical 2-, 4- or 6-channel units.
- E-7000 Standard digital PS/Readouts, both single- and multi-channel configurations, featuring many functions e.g. totalization, alarms, direct reading and master/slave.

OTHER BRONKHORST HI-TEC PRODUCTS

- Filter assemblies
- Calibrators
- Mixing chambers

BRONKHORST
HI-TEC

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