

# DATASHEET ML120V21

## mini CORI-FLOW™ ML120V21

(Ultra) Low Flow Coriolis Mass Flow Controller



### Low Flow Coriolis Mass Flow Controllers for Gases and Liquids

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 ML120V21 Mass Flow Controller (MFC) is suited for highly accurate measurement and control of gas or liquid flow in the range of 0...200 g/h (which corresponds with 0...2,66 l<sub>n</sub>/min when used on nitrogen) at operating pressures up to 5 bar.

The mass flow controller offers “multi-range” functionality: factory calibrated ranges can be rescaled by the user, maintaining the original accuracy specs. The instrument contains a microprocessor based pc-board with signal and fieldbus conversion and a PID controller for mass flow control by means of the integrated piezoelectric control valve.

### Technical specifications

#### Measurement / control system

|                                     |  |
|-------------------------------------|--|
| Flow rates                          | Liquid: 0...200 g/h (nominal flow rate: 100 g/h);<br>Gas: 0...2.66 l <sub>n</sub> /min (N <sub>2</sub> );<br>Full Scale (FS) value is user-configurable;<br>advised minimum flow depends on fluid properties   |
| Mass flow accuracy                  | Liquid: ±0,2% Rd;<br>Gas: ±0,5% Rd   |
| Repeatability                       | ± 0,05 % of rate ± ½(ZS* x 100/actual flow)%   |
| Turndown ratio                      | 1:100  |
| Zero stability (ZS)                 | < ± 10 mg/h<br>(Guaranteed at constant temperature and for unchanging process and environment conditions.)   |
| Settling time (in control, typical) | 1 sec.   |
| Temperature effect                  | on zero: < 3 mg/h/°C;<br>on span: < 0,005% Rd/°C;<br>self heating (at zero flow): < 10°C<br>(Depends on flow rate, heat capacity fluid, T amb., T fluid and cooling capacity.)                                 |
| Operating temperature               | 0 ... 70 °C  |
| Mounting                            | any position, attitude sensitivity negligible.<br>Instrument to be rigidly bolted to a stiff and heavy mass or construction for guaranteed zero stability.<br>External shocks or vibrations should be avoided. |
| Temperature accuracy                | ± 0,5 °C   |
| Density accuracy                    | < ± 5 kg/m³ (at full scale flow)   |
| Leak integrity, outboard            | < 2 x 10 <sup>-8</sup> mbar l/s He   |

## Measurement / control system

|              |                               |
|--------------|-------------------------------|
| Warm-up time | > 30 min for optimum accuracy |
|--------------|-------------------------------|

## Mechanical parts

|                         |   |
|-------------------------|---|
| Sensor                  | single tube, DN 0.25; frequency 170 Hz $\pm$ 20 Hz        |
| Valve                   | piezoelectric valve (metal plunger)                       |
| Material (wetted parts) | stainless steel 316L or comparable                        |
| Pressure rating (PN)    | 5 bar g (higher on request);<br>max. $\Delta P$ : 5 bar d |
| Process connections     | compression type or face seal (VCR/VCO) couplings         |
| Seals                   | Kalrez®   |
| Weight                  | 0,9 kg  |
| Ingress protection      | IP40  |

## Electrical properties

|                        |  |
|------------------------|--|
| Power supply           | +15...24 Vdc $\pm$ 10%<br>Max. ripple recommended: 50 mV tt  |
| Max. power consumption | max. 3 W   |
| Analog output          | 0...5 (10) Vdc, min. load impedance > 2 k $\Omega$ ;<br>0 (4)...20 mA (sourcing), max. load impedance < 375 $\Omega$                                 |
| Analog setpoint        | 0...5 (10) Vdc, min. load impedance > 100 k $\Omega$ ;<br>0 (4)...20 mA (sourcing), max. load impedance $\sim$ 250 $\Omega$                          |
| Digital communication  | standard: RS232<br>options: PROFIBUS DP, CANopen®, DeviceNet™, PROFINET, EtherCAT®, Modbus RTU, ASCII or TCP/IP,<br>EtherNet/IP, POWERLINK, FLOW-BUS |

## Electrical connection

|   |  |
|---|--|
| Analog/RS232                            | 9-pin D-connector (male);  |
| PROFIBUS DP                             | bus: 9-pin D-connector (female);<br>power: 9-pin D-connector (male); |
| CANopen® / DeviceNet™                   | 5-pin M12-connector (male);  |
| FLOW-BUS/Modbus-RTU/ASCII               | RJ45 modular jack;   |
| Modbus TCP / EtherNet/IP /<br>POWERLINK | 2 x RJ45 modular jack (in/out);                                      |
| EtherCAT® / PROFINET                    | 2 x RJ45 modular jack (in/out);                                      |

## 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™  
ML120V00

Flow range 0...200 g/h  
Pressure rating 200 bar  
Independent of fluid properties  
High accuracy, fast measurement



MINI CORI-FLOW™  
M12V14I

Flow range 0...200 g/h  
Pressure rating 100 bar  
Independent of fluid properties  
High accuracy, fast control



MINI CORI-FLOW™  
CORIOLIS WITH PUMP

Min. flow 0,05...5 ml/h  
Max. flow 6...600 l/h  
Compact, integrated dosing solution  
Direct pump control

