

# F-201DI

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## LOW- $\Delta$ P-FLOW F-201DI

Mass Flow Controller for low pressure drop or corrosive gas service, industrial style

- Large bore capillary (thermal bypass sensor)
- Very low pressure drop
- Less sensitivity to humidity or dirt
- Suitable of corrosive gases
- Easy to purge
- Rugged, weatherproof construction (IP65, dust and waterproof)



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### Thermal Mass Flow Controllers for low pressure drop or corrosive gas applications, industrial style

Bronkhorst® model F-201DI Mass Flow Controllers (MFCs) are suited for precise measurement of flow ranges between 0,42...21 ml<sub>n</sub>/min and 0,042...2,1 l<sub>n</sub>/min (N<sub>2</sub>-equivalent). The instruments are particularly suited for corrosive gases or applications with very low differential pressure ( $\Delta$ P). Compared to conventional instruments, LOW- $\Delta$ P-FLOW MFCs have larger flow channels to minimize the risk of clogging, facilitate cleaning and purging, and cause lower pressure drop (the sensor only requires 0,5 to 5 mbar). This model is of rugged design (IP65) for use in industrial environments or even Zone 2 hazardous areas, with optional ATEX Cat. 3 or FM Class I, Div. 2 approval.

The integrated digital pc-board provides signal and fieldbus conversion as well as PID controller functionality for mass flow control by means of the integrated control valve. In addition to the standard RS232 output the instruments also offer analog I/O. As an option, an on-board interface can be mounted to provide CANopen®, DeviceNet™, PROFIBUS DP, PROFINET, Modbus RTU/ASCII or FLOW-BUS protocols.

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### Technical specifications

## Measurement / control system

|  |   |
|--|---|
| Flow range (intermediate ranges available)               | min. 0,42...21 ml <sub>n</sub> /min<br>max. 0,042...2,1 l <sub>n</sub> /min<br>(based on N <sub>2</sub> ) |
| Accuracy (incl. linearity) (based on actual calibration) | ± 1 % FS  |
| Repeatability  | < 0,2 % RD  |
| Turndown ratio   | 1:50 (2...100%)   |
| Max. operating pressure                                  | 10 bar g  |
| Multi fluid capability                                   | storage of max. 8 calibration curves  |
| Settling time (in control, typical)                      | 2 ... 3 sec.  |
| Control stability  | < ± 0,1 % FS (typical)  |
| Operating temperature                                    | -10 ... +70 °C<br>for ATEX cat. 3 and FM Class 1 Div 2 : 0...50°C   |
| Mounting   | horizontal  |
| Temperature sensitivity                                  | < 0,1% FS/°C  |
| Pressure sensitivity                                     | 0,1% Rd/bar typical N <sub>2</sub>  |
| Max. Kv-value  | 6,6 x 10 <sup>-2</sup>  |
| Leak integrity, outboard                                 | tested < 2 x 10 <sup>-9</sup> mbar l/s He   |
| Warm-up time   | 30 min. for optimum accuracy<br>2 min for accuracy ± 2% FS  |

## Mechanical parts

|                         |   |
|-------------------------|---|
| Material (wetted parts) | stainless steel 316L or comparable;<br>other on request                                     |
| Process connections     | compression type or face seal (VCR/VCO) couplings   |
| Seals                   | standard: Viton®;<br>options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds |
| Weight                  | 1,3 kg  |
| Ingress protection      | IP65  |

## Electrical properties

|                        |  |                |                |                    |
|------------------------|--|----------------|----------------|--------------------|
| Power supply           | +15 ... 24 Vdc   |                |                |                    |
| Max. power consumption | Supply   | at voltage I/O | at current I/O | extra for fieldbus |
|                        | 15 V   | 290 mA         | 320 mA         | <75 mA             |
|                        | 24 V   | 200 mA         | 215 mA         | <50 mA             |
| Analog output          | 0...5 (10) Vdc or 0 (4)...20 mA (sourcing output)  |                |                |                    |
| Digital communication  | standard: RS232;<br>options: CANopen®, DeviceNet™, PROFIBUS DP, PROFINET, Modbus RTU/ASCII or FLOW-BUS |                |                |                    |

## Electrical connection

|                           |   |
|---------------------------|---|
| Analog/RS232              | 8 DIN (male);   |
| PROFIBUS DP               | bus: 5-pin M12 (female);<br>power: 8 DIN (male);  |
| CANopen® / DeviceNet™     | 5-pin M12 (male);   |
| FLOW-BUS/Modbus-RTU/ASCII | 5-pin M12 (male)  |
| PROFINET                  | bus: 2 x 5-pin M12 (female) (in/out);<br>power: 8 DIN (male);                                       |
| IEC 61010-1               | IEC-61010-1:2010 including national deviations for UL (61010-1:2012) and CSA (C22.2 No. 61010-1-12) |

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



### IN-LINE FILTER SERIE M-411 RS

1/4" female in / male out

100 bar

Average porosity 0.5...15  $\mu\text{m}$

## Related products



**LOW- $\Delta$ P-FLOW F-200DI**

Min. flow 0,2...10 mln/min  
Max. flow 0,4...20 mln/min  
Pressure rating up to 10 bar  
Low  $\Delta$ P, easy to purge  
Compact IP65 design



**LOW- $\Delta$ P-FLOW F-201EI**

Min. flow 0,028...1,4 l/min  
Max. flow 0,24...12 l/min  
Pressure rating up to 10 bar  
Low  $\Delta$ P, easy to purge  
Compact IP65 design



**LOW- $\Delta$ P-FLOW F-201DV**

Min. flow 0,42...21 mln/min  
Max. flow 0,042...2,1 l/min  
Pressure rating up to 10 bar  
Low  $\Delta$ P, easy to purge  
Compact design



**LOW- $\Delta$ P-FLOW F-101DI**

Min. flow 0,42...21 mln/min  
Max. flow 0,042...2,1 l/min  
Pressure rating up to 10 bar  
Low  $\Delta$ P, easy to purge  
Compact IP65 design



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