# DATASHEET F-200DV

## LOW-ΔP-FLOW F-200DV

Mass Flow Controller for low pressure drop or corrosive gas service


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

Bronkhorst® model F-200DV Mass Flow Controllers (MFCs) are suited for precise measurement of flow ranges between 0,2…10 $ml_n$/min and 0,4…20 $ml_n$/min ($N_2$-equivalent). The instruments are particularly suited for corrosive gases or applications with very low differential pressure (ΔP). Compared to conventional instruments, LOW-ΔP-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).

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™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS protocols.

### Technical specifications

**Measurement / control system**

| | |
|---|---|
| Flow range (intermediate ranges available) | min. 0,2…10 $ml_n$/min<br>max. 0,4…20 $ml_n$/min<br>(based on $N_2$) |
| 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 |
| Mounting | horizontal |
| Temperature sensitivity | < 0,1% FS/°C |
| Pressure sensitivity | 0,1% Rd/bar typical $N_2$ |
| Max. Kv-value | $6{,}6 \times 10^{-2}$ |
| Leak integrity, outboard | tested < $2 \times 10^{-9}$ 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: FKM/Viton®;<br>options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds |
| Weight | 0,6 kg |
| Ingress protection | IP40 |

**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: PROFIBUS DP, CANopen®, DeviceNet™, PROFINET, EtherCAT®, Modbus RTU, ASCII or TCP/IP, 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 / 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


### IN-LINE FILTER
### ULTRA LOW FLOW SERIE M-410

- 1/8" female in / male out
- 100 bar
- Average porosity 0.5...15 µm

## Related products


### LOW-ΔP-FLOW F-201DV

- Min. flow 0,42…21 mln/min
  Max. flow 0,042…2,1 ln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact design


### LOW-ΔP-FLOW F-200DI

- Min. flow 0,2…10 mln/min
  Max. flow 0,4…20 mln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact IP65 design


### LOW-ΔP-FLOW F-100D

- Min. flow 0,2…10 mln/min
  Max. flow 0,4…20 mln/min
- Pressure rating up to 10 bar
- Very low pressure drop
- Suitable for corrosive gases

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Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!