

# DATASHEET F-201DV

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

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-201DV 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).

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. 0,42...21 ml <sub>n</sub> /min max. 0,042...2,1 l <sub>n</sub> /min (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
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 2 min for accuracy ± 2% FS

## Mechanical parts

Material (wetted parts)	stainless steel 316L or comparable; other on request
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: FKM/Viton®; 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; 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); 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 LOW FLOW SERIE M-411

1/4" female in / male out  
100 bar  
Average porosity 0.5...15  $\mu\text{m}$

## Related products



### LOW-ΔP-FLOW F-200DV

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



### LOW-ΔP-FLOW F-201EV

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



### LOW-ΔP-FLOW F-201DI

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



### LOW-ΔP-FLOW F-201DS

Min. flow 0,42...21 mln/min  
Max. flow 0,042...2,1 ln/min  
Pressure rating 10 bar  
Low  $\Delta\text{P}$ , easy to purge  
Integrated electrical shut-off