

# F-103D

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## LOW- $\Delta$ P-FLOW F-103D

Mass Flow Meter for low pressure drop or corrosive gas service

- Large bore capillary (thermal bypass sensor)
- Very low pressure drop
- Less sensitivity to humidity or dirt
- Suitable of corrosive gases
- Easy to purge



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

Bronkhorst® model F-103D Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 0,8...40 l<sub>n</sub>/min and 3...150 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 meters 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 optional mass flow control by means of a (separately mounted) 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.

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### Technical specifications

## Measurement / control system

Flow range (intermediate ranges available) min. 0,8...40 I<sub>n</sub>/min  
max. 3...150 I<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

Response time (sensor) 1 ... 2 sec.

Operating temperature -10 ... +70 °C

Mounting horizontal

Temperature sensitivity < 0,1% FS/°C

Pressure sensitivity 0,1% Rd/bar typical N<sub>2</sub>; 0,01% Rd/bar typical H<sub>2</sub>

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: Viton®;  
options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds

Weight

4,0 kg

Ingress protection

IP40

## Electrical properties

Power supply +15 ... 24 Vdc

Max. power consumption meter	Supply	at voltage I/O	at current I/O	extra for fieldbus
	15 V	95 mA	125 mA	<75 mA
	24 V	65 mA	85 mA	<50 mA

Max. Power consumption controller	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**

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**External actuator options to be connected to the controller**

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**Ex-proof specifications**

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**Approvals / certificates**

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Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

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## 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-423 RS

1/2" female in / male out

200 bar

Average porosity 2...40 µm

## Related products



**LOW-ΔP-FLOW F-102E**

Min. flow 0,17...8,5 l/min  
Max. flow 1...50 l/min  
Pressure rating up to 10 bar  
Very low pressure drop  
Suitable for corrosive gases



**LOW-ΔP-FLOW F-103E**

Min. flow 0,9...45 l/min  
Max. flow 4...200 l/min  
Pressure rating up to 10 bar  
Very low pressure drop  
Suitable for corrosive gases



**LOW-ΔP-FLOW F-103DI**

Min. flow 0,8...40 l/min  
Max. flow 3...150 l/min  
Pressure rating up to 10 bar  
Low ΔP, easy to purge  
Compact IP65 design



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