

# F-101E

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## LOW- $\Delta$ P-FLOW F-101E

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-101E Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 0,028...1,4 l<sub>n</sub>/min and 0,24...12 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 or FLOW-BUS protocols.

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### Technical specifications

## Measurement / control system

Flow range (intermediate ranges available) min. 0,028...1,4 I<sub>N</sub>/min  
max. 0,24...12 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 0,5 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, FLOW-BUS

## Electrical connection

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

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-ΔP-FLOW F-101D**

Min. flow 0,42...21 ml/min  
Max. flow 0,042...2,1 l/min  
Pressure rating up to 10 bar  
Very low pressure drop  
Suitable for corrosive gases



**LOW-ΔP-FLOW F-102D**

Min. flow 0,28...14 l/min  
Max. flow 0,5...25 l/min  
Pressure rating up to 10 bar  
Very low pressure drop  
Suitable for corrosive gases



**LOW-ΔP-FLOW F-101EI**

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



**LOW-ΔP-FLOW F-201EV**

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



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