

F-111BI

IN-FLOW F-111BI

Industrial Style Thermal Mass Flow Meter for Gases

- High accuracy, excellent repeatability
- Optional Multi Fluid / Multi Range functionality
- Virtually pressure and temperature independent
- Rugged, weatherproof housing (IP65, dust and waterproof)
- Compact design



Industrial Style Gas Mass Flow Meters for low flow rates

Bronkhorst® model F-111BI Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 0,16...8 ml_n/min and 0,16...25 l_n/min with pressure rating between vacuum and 100 bar. The MFM consists of a thermal mass flow sensor and a microprocessor based pc-board with signal and fieldbus conversion and a PID controller for optional mass flow control by means of a separately mounted control valve. The IN-FLOW 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.

IN-FLOW series are equipped with a digital pc-board, offering high accuracy, excellent temperature stability and fast response. The main digital pc-board contains all of the general functions needed for measurement and control. 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. The IN-FLOW model features optional Multi Gas / Multi Range functionality, providing (OEM-) customers with optimal flexibility and process efficiency.

Technical specifications

Measurement / control system

Flow range (intermediate ranges available) min. 0,16...8 ml_n/min
max. 0,16...25 l_n/min
(based on N₂)

Accuracy (incl. linearity) (based on actual calibration) ±0,5% Rd plus ±0,1% FS

Repeatability < 0,2 % RD

Turndown ratio up to 1:187,5 (1:50 in analog mode)

Multi fluid capability storage of max. 8 calibration curves;
optional Multi Gas / Multi Range functionality up to 10 bar abs

Response time (sensor) typical: 0,5 sec.

Operating temperature -10 ... +70 °C
for ATEX cat. 3 and FM Class 1 Div 2 : 0...50°C

Temperature sensitivity zero: < 0,05% FS/°C; span: < 0,05% Rd/°C

Pressure sensitivity 0,1% Rd/bar typical N₂; 0,01% Rd/bar typical H₂

Leak integrity, outboard tested < 2 x 10⁻⁹ mbar l/s He

Attitude sensitivity max. error at 90° off horizontal 0,2% FS at 1 bar, typical N₂

Warm-up time 30 min. for optimum accuracy
2 min for accuracy ± 2% FS

Mechanical parts

Material (wetted parts) stainless steel 316L or comparable

Pressure rating (PN) 100 bar abs

Process connections compression type or face seal couplings

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

Weight 0,9 kg

Ingress protection IP65

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: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS			
Electrical connection				
Analog/RS232	8 DIN (male);			
PROFIBUS DP	bus: 5-pin M12 (female); power: 8 DIN (male);			
CANopen® / DeviceNet™	5-pin M12 (male);			
FLOW-BUS/Modbus-RTU/ASCII	5-pin M12 (male)			
Modbus TCP / EtherNet/IP / POWERLINK	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male);			
EtherCAT® / PROFINET	bus: 2 x 5-pin M12 (female) (in/out); 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)			

Control valve options

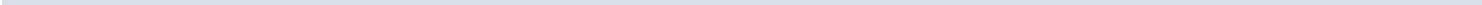
External actuator options to be connected to the controller

Ex-proof specifications

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 SERIE M-411 RS

1/4" female in / male out

100 bar

Average porosity 0.5...15 μm

Related products



IN-FLOW F-110CI

Min. flow 0,014...0,7 mln/min
Max. flow 0,06...9 mln/min
Pressure rating 100 bar
Compact IP65 design
High accuracy



IN-FLOW F-111AI

Min. flow 0,4...20 ln/min
Max. flow 0,6...100 ln/min
Pressure rating 100 bar
Compact IP65 design
High accuracy



IN-FLOW F-201CI

Min. flow 0,16...8 mln/min
Max. flow 0,5...25 ln/min
Pressure rating 64 bar
Compact IP65 design
High accuracy and repeatability



BRONKHORST HIGH-TECH B.V.

Nijverheidsstraat 1A
NL-7261 AK Ruurlo (NL)
Tel. [+31 573 45 88 00](tel:+31573458800)
info@bronkhorst.com

