

# DATASHEET F-121MI

## IN-FLOW F-121MI

High-Pressure Mass Flow Meter for Gases, Industrial Style



### Gas Mass Flow Meters for low flow rates

Bronkhorst® model F-121MI Mass Flow Meters (MFM) are suited for precise measurement of flow ranges between 0,3...15 ml<sub>n</sub>/min and 0,4...20 l<sub>n</sub>/min at operating pressures up to 200 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.

### Technical specifications

#### Measurement / control system

Flow range (intermediate ranges available)	min. 0,3...15 ml <sub>n</sub> /min max. 0,4...20 l <sub>n</sub> /min (based on N <sub>2</sub> )
Accuracy (incl. linearity) (based on actual calibration)	±0,5% Rd plus ±0,1% FS
Repeatability	< 0,2 % RD
Turndown ratio	1:50
Multi fluid capability	Storage of max. 8 calibration curves
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 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
Attitude sensitivity	max. error at 90° off horizontal 0,2% FS at 1 bar, typical N <sub>2</sub>
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)	200 bar abs
Process connections	compression type or face seal couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®
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

### 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

## Related products



**IN-FLOW F-120MI**

Min. flow 0,2...10 ml/min  
Max. flow 0,3...15 ml/min  
Pressure rating 200 bar  
Compact IP65 design  
High accuracy



**IN-FLOW F-122MI**

Min. flow 0,3 ... 15 l/min  
Max. flow 5 ... 250 l/min  
Pressure rating 200 bar  
Compact IP65 design  
High accuracy



**IN-FLOW F-221MI**

Min. flow 0,3...15 ml/min  
Max. flow 0,4...20 l/min  
Working pressure /  $\Delta P$  up to 200 bar  
Compact IP65 design  
High accuracy and repeatability