# DATASHEET F-116BI

## IN-FLOW 'High-Flow' F-116BI

Industrial Style Mass Flow Meter for High Gas Flow


### Industrial Style Gas Mass Flow Meters for high flow rates

Bronkhorst® model F-116BI Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 1…50 $m^3_n$/h and 7,5…375 $m^3_n$/h at operating pressures up to 95 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. 1…50 $m^3_n$/h<br>max. 7,5…375 $m^3_n$/h<br>(based on $N_2$) |
| Accuracy (incl. linearity) (based on actual calibration) | ± 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<br>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 $N_2$; 0,01% Rd/bar typical $H_2$ |
| 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 $N_2$ |
| Warm-up time | 30 min. for optimum accuracy<br>2 min for accuracy ± 2% FS |

**Mechanical parts**

| | |
|---|---|
| Material (wetted parts) | stainless steel 316L or comparable |
| Pressure rating (PN) | 95 bar abs |
| Process connections | compression type or face seal couplings |
| Seals | standard: FKM/Viton®;<br>options: EPDM, FFKM/Kalrez® |
| Weight | 8,0 kg |
| Ingress protection | IP65 |

**Electrical properties**

| | | | | |
|---|---|---|---|---|
| Power supply | +15 … 24 Vdc | | | |
| Max. power consumption meter | Supply<br>15 V<br>24 V | at voltage I/O<br>95 mA<br>65 mA | at current I/O<br>125 mA<br>85 mA | extra for fieldbus<br><75 mA<br><50 mA |
| Max. Power consumption controller | Supply<br>15 V<br>24 V | at voltage I/O<br>290 mA<br>200 mA | at current I/O<br>320 mA<br>215 mA | extra for fieldbus<br><75 mA<br><50 mA |
| Analog output | 0…5 (10) Vdc or 0 (4)…20 mA (sourcing output | | | |
| Digital communication | standard: RS232;<br>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);<br>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);<br>power: 8 DIN (male); |
| EtherCAT®/ PROFINET | bus: 2 x 5-pin M12 (female) (in/out);<br>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

## Related products


### IN-FLOW 'HIGH-FLOW' F-116AI

- Min. flow 0,3 ... 15 m3n/h Max. flow 4 ... 200 m3n/h
- Pressure rating 100 bar
- Compact IP65 design
- High accuracy


### IN-FLOW 'HIGH-FLOW' F-206BI

- Min. flow 1 ... 50 m3n/h Max. flow 7,5 ... 375 m3n/h
- Pressure rating 64 bar
- Compact IP65 design
- High accuracy and repeatability


### IN-FLOW 'HIGH-FLOW' F-106BI

- Min. flow 1 ... 50 m3n/h Max. flow 10 ... 500 m3n/h
- Pressure rating up to 40 bar
- Wafer type connection (DIN/ANSI)
- Rugged IP65 housing


### IN-FLOW 'HIGH-FLOW' F-106CI

- Min. flow 2 ... 100 m3n/h Max. flow 20 ... 1000 m3n/h
- Pressure rating up to 40 bar
- Wafer type connection (DIN/ANSI)
- Rugged IP65 housing

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Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!