

DATASHEET F-111CM

EL-FLOW Metal Sealed F-111CM

Metal Sealed Mass Flow Meter for Gases



Metal Sealed Gas Mass Flow Meters

Bronkhorst® model F-111CM Mass Flow Meters (MFMs) designed especially to meet the requirements of the semicon market as well as other high purity gas applications. The instruments feature high surface quality and are of modular construction with metal-to-metal seals that ensure long-term leak tightness. The F-111CM is suited for precise measurement of flow ranges between 0.12...6 sccm up to 1...50 slm (based on N₂) at operating pressures between vacuum and 1500 psig (100 bar).

EL-FLOW® Metal Sealed 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 EL-FLOW® Metal Sealed design 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. 0,12...6 ml _n /min max. 1...50 l _n /min (based on N ₂) |
| Accuracy (incl. linearity) (based on actual calibration) | ±0,5% Rd plus ±0,1% FS |
| Repeatability | < 0,2 % RD |
| Turndown ratio | 1:150 (1:50 in analog mode) |
| Max. operating pressure | 1500 psig (100 bar abs) |
| Multi fluid capability | storage of max. 8 calibration curves; optional Multi Gas / Multi Range functionality up to 10 bar abs |
| Operating temperature | -10...+70 °C |
| Mounting | any position, attitude sensitivity negligible |
| 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 H ₂ |
| Leak integrity, outboard | < 2 x 10 ⁻¹¹ Pa.m ³ /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 |
| Process connections | 1/4" face seal male |
| Seals | Outer seals: metal-to-metal (no rings); Inner seal: Kalrez 6375 |
| Weight | 0,6 kg |
| Ingress protection | IP40 |

Electrical properties

| | | | | |
|------------------------|---|----------------|----------------|--------------------|
| Power supply | + 15 ... 24 Vdc | | | |
| Max. power consumption | 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 |
| 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

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](#)

Related products



EL-FLOW METAL SEALED F-201CM

Min. flow 0,12...6
mln/min
Max. flow 1... 50 l/min
Pressure rating 64 bar
Metal-to-metal outer
seals
Cleanroom assembled



EL-PRESS METAL SEALED P-602CM (P2-CONTROL)

Min. pressure 2...100
mbar
Max. pressure 1,28...64
bar
Metal-to-metal outer
seals
Cleanroom assembled



EL-PRESS METAL SEALED P-702CM (P1-CONTROL)

Min. pressure 2...100
mbar
Max. pressure 1,28...64
bar
Metal-to-metal outer
seals
Cleanroom assembled



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®!