

# 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 N<sub>2</sub>) 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 <sub>n</sub> /min max. 1...50 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	1:150 (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 <sub>2</sub> ; < 0,01% Rd/bar H <sub>2</sub>
Leak integrity, outboard	< 2 x 10 <sup>-11</sup> Pa.m <sup>3</sup> /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  
mIn/min  
Max. flow 1... 50 lIn/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