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_2) 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 ln/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®

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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®!