

# DATASHEET FG-110C

## EL-FLOW Prestige FG-110C

### ガス用高性能マスフローメータ



### Gas Mass Flow Meters for lowest flow rates

Bronkhorst® model FG-110C High Performance Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 0,014...0,7 ml<sub>n</sub>/min and 0,18...9 ml<sub>n</sub>/min at operating pressures between vacuum and 100 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.

EL-FLOW® Prestige 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® Prestige design features standard 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. 0,014...0,7 ml <sub>n</sub> /min max. 0,18...9 ml <sub>n</sub> /min (based on N <sub>2</sub> )
Accuracy (incl. linearity) (based on actual calibration)	standard: ±0,5% Rd plus ±0,1%FS (±0,8% Rd plus ±0,2% FS for ranges 3...5 ml <sub>n</sub> /min; ±1% Rd plus ±1% FS for ranges < 3 ml <sub>n</sub> /min)
Repeatability	< 0,2 % RD
Turndown ratio	1:150 (1:50 in analog mode)
Multi Gas/Multi Range	embedded gas data for <u>100 unique gases</u> , plus any mixture of maximum 5 of these gases. MG/MR functionality available up to 64 bar.
Operating temperature	-10 ... 70 °C
Temperature sensitivity	zero: < 0,02% FS/°C; span: < 0,025% Rd/°C
Pressure sensitivity	<0,15% Rd/bar typical N <sub>2</sub> ; < 0,02% Rd/bar N <sub>2</sub> (incl. pressure correction option)
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He
Attitude sensitivity	max. error at 90° off horizontal 0,07% FS at 1 bar, typical N <sub>2</sub>

## Measurement / control system

Warm-up time	30 min. for optimum accuracy 2 min. for accuracy $\pm 1\%$ FS
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## Mechanical parts

Material (wetted parts)	Stainless steel 316L or comparable, degreased for use on oxygen (O <sub>2</sub> )
Pressure rating (PN)	100 bar g
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: Viton® options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds
Weight	0,5 kg
Ingress protection	IP40

## 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	69 mA	92 mA	<75 mA
	24 V	45 mA	63 mA	<50 mA
Max. Power consumption controller	Supply	at voltage I/O	at current I/O	extra for fieldbus
	15 V	202 mA	225 mA	<75 mA
	24 V	128 mA	146 mA	<50 mA
	(based on normally closed valve, pin 5 not used)			
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			
CE	EMC 2014/30/EU, RoHS 2011/65/EU			

## 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)
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

### デジタル表示設定システム

明瞭、広角の1.8" TFTディスプレイ  
4つのボタンによるユーザーフレンドリーな操作



BRIGHT SERIES

### 小型ローカル指示設定モジュール

明瞭、広角の1.8"ディスプレイ  
ユーザーフレンドリーな操作  
表示/運転/設定



PIPS SERIES

### プラグイン電源 PIPS

ラボ用および一般工業用  
交換可能な主電源用プラグ  
(欧州、英国、米国(日本向け)、豪州、IEC)



IN-LINE FILTER  
SERIE M-410 RS

入出口1/8"おねじ/めねじ  
10 MPa  
平均孔径 0.5...15 µm

## Related products



EL-FLOW PRESTIGE FG-111B

最小流量レンジ0.14...7  
mln/min  
最大流量レンジ0.4...20  
l/min  
定格圧力10 MPa  
約100種のカステータ  
カスタマイズ可能なI/O構成



EL-FLOW PRESTIGE FG-200CV

最小流量レンジ0.014...0.7  
mln/min  
最大流量レンジ0.18...9  
mln/min  
定格圧力6.4 MPa  
約100種のカステータ  
カスタマイズ可能なI/O構成



EL-FLOW PRESTIGE FG-110CP  
(P-INSENSITIVE)

最小流量レンジ0.014...0.7  
mln/min  
最大流量レンジ0.18...9  
mln/min  
定格圧力10 MPa  
オンボード圧力補正  
約100種のカステータ



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