

# FG-210CV

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## EL-FLOW Prestige FG-210CV

High Performance Mass Flow Controller for Gases

- On-board gas conversion model (Multi-Fluid / Multi-Range)
- 100 unique gases embedded
- User configurable I/O functions
- Significantly reduced power consumption
- Further advances in flow-signal processing
- Highly stable flow control regime virtually impervious to process fluctuations
- Advanced control valve design



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### Gas Mass Flow Controllers for lowest flow rates

Bronkhorst® model FG-210CV High Performance Mass Flow Controllers (MFCs) are suited for accurate measurement and control 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 up to 100 bar. The MFC consists of a thermal mass flow sensor, a precise control valve and a microprocessor based pc-board with signal and fieldbus conversion. As a function of a setpoint value, the flow controller swiftly adjusts the desired flow rate.

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.

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### 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 100 bar.
Settling time (in control, typical)	< 2 sec.
Control stability	≤ ± 0,1 % FS (typical for 1 l <sub>n</sub> /min N <sub>2</sub> )
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)
Max. Kv-value	6,6 x 10 <sup>-2</sup>
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>
Warm-up time	30 min. for optimum accuracy 2 min. for accuracy ± 1% FS

## 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	0,7 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
	15V	202 mA	225 mA	<75 mA
	24V	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			

## 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)
CE	EMC 2014/30/EU, RoHS 2011/65/EU,
IEC 61010-1	IEC-61010-1:2010 including national deviations for UL (61010-1:2012) and CSA (C22.2 No. 61010-1-12)

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



### IN-LINE FILTER SERIE M-411 RS

1/4" female in / male out  
100 bar  
Average porosity 0.5...15  $\mu\text{m}$

## Related products



**EL-FLOW PRESTIGE FG-200CV**

Min. flow 0,014...0,7 mln/min  
Max. flow 0,18...9 mln/min  
Pressure rating 64 bar  
100 selectable gases  
Customized I/O configurations



**EL-FLOW PRESTIGE FG-211CV**

Min. flow 0,14...7 mln/min  
Max. flow 0,4...20 lln/min  
Pressure rating 100 bar  
100 selectable gases  
Customized I/O configurations



**EL-FLOW PRESTIGE FG-110C**

Min. flow 0,014...0,7 mln/min  
Max. flow 0,18...9 mln/min  
Pressure rating 100 bar  
100 selectable gases  
Customized I/O configurations



**EL-FLOW PRESTIGE FG-210CVP (P-INSENSITIVE)**

Min. flow 0,014...0,7 mln/min  
Max. flow 0,18...9 mln/min  
Pressure rating 100 bar  
On-board pressure correction  
100 selectable gases



**BRONKHORST USA LLC**

57 South Commerce Way

Suite 120

USA - Bethlehem, PA 18017

Tel. [+1-610-866-6750](tel:+16108666750)

[sales@bronkhorstusa.com](mailto:sales@bronkhorstusa.com)