

# DATASHEET FG-210CVP

## EL-FLOW Prestige FG-210CVP (P-Insensitive)

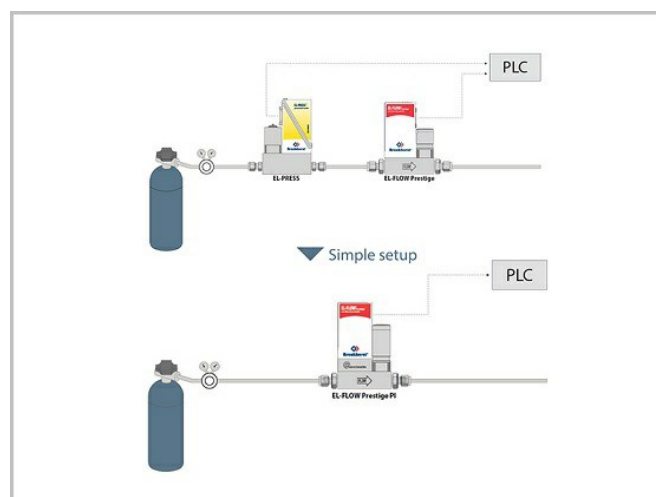
High Performance Mass Flow Controller for Gases



### Pressure Insensitive Gas Mass Flow Controllers for low flow rates

Bronkhorst® model FG-210CVP 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 between vacuum and 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. Model FG-210CVP is equipped with an on-board pressure sensor. In combination with an incorporated gas database with physical properties, the instrument automatically compensates for inlet pressure variations. As a result, the accuracy and control stability will not be affected by these pressure changes.

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.



More simple setup possible with EL-FLOW Prestige Pressure Insensitive (PI) model

### 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) ± 0,5 % RD plus ±0,1%FS

Repeatability < 0,2 % RD

Turndown ratio 1:150 (1:50 in analog mode)

Multi Gas/Multi Range embedded gas data for 100 unique gases, plus any mixture of maximum 5 of these gases. MG/MR available up to 100 bar.

## Measurement / control system

Settling time (in control, typical)	fast: < 500 msec standard: < 1 sec slow: < 2 sec
Control stability	$\leq \pm 0,1$ % FS (typical for 1 l/min N <sub>2</sub> )
Operating temperature	-10 ... 70 °C
Temperature sensitivity	zero: < 0,02% FS/°C; span: < 0,025% Rd/°C
Pressure sensitivity	< 0,02% Rd/bar typical N <sub>2</sub>
Max. Kv-value	$6,6 \times 10^{-2}$
Leak integrity, outboard	tested < $2 \times 10^{-9}$ 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

## 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
Pressure sensor	P-max: 130 bara; Burst pressure 350 bara
Process connections	compression type or face seal couplings
Seals	standard: Viton® options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds valve seat: FFKM with PI film
Weight	0,8 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	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
Certification	CE / UKCA

## 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

## Electrical connection

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

#### 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 LOW FLOW SERIE M-411

1/4" female in / male out  
100 bar  
Average porosity 0.5...15 µm

## Related products



**EL-FLOW PRESTIGE FG-200CVP (P-INSENSITIVE)**

Min. flow 0,014...0,7  
mln/min  
Max. flow 0,18...9  
mln/min  
Pressure rating 10 bar  
On-board pressure  
correction  
100 selectable gases



**EL-FLOW PRESTIGE FG-211CVP (P-INSENSITIVE)**

Min. flow 0,14...7  
mln/min  
Max. flow 0,4...20 lln/min  
Pressure rating 100 bar  
On-board pressure  
correction  
100 selectable gases



**EL-FLOW PRESTIGE FG-111BP (P-INSENSITIVE)**

Min. flow 0,14...7  
mln/min  
Max. flow 0,4...20 lln/min  
Pressure rating 100 bar  
On-board pressure  
correction  
100 selectable gases



**EL-FLOW PRESTIGE FG-210CV**

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