

DATASHEET FG-210CV

EL-FLOW Prestige FG-210CV

High Performance Mass Flow Controller for Gases



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_n/min and 0,18...9 ml_n/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.

Technical specifications

Measurement / control system

Flow range (intermediate ranges available)	min. 0,014...0,7 ml _n /min max. 0,18...9 ml _n /min (based on N ₂)
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 _n /min; ±1% Rd plus ±1% FS for ranges < 3 ml _n /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 _n /min N ₂)
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 ₂ ; < 0,02% Rd/bar N ₂ (incl. pressure correction option)
Max. Kv-value	6,6 x 10 ⁻²
Leak integrity, outboard	tested < 2 x 10 ⁻⁹ mbar l/s He
Attitude sensitivity	max. error at 90° off horizontal 0,07% FS at 1 bar, typical N ₂

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 ₂)
Pressure rating (PN)	100 bar g
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: FKM/Viton® options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds valve seat: FFKM with PI film
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
	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)
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Digital communication	standard: RS232; options: PROFIBUS DP, CANopen®, DeviceNet™, PROFINET, EtherCAT®, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK, FLOW-BUS
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Certification	CE / UKCA
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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](#)

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