DATASHEET FG-211CV

EL-FLOW Prestige FG-211CV

High Performance Mass Flow Controller for Gases

Gas Mass Flow Controllers for low flow rates

Bronkhorst[®] model FG-211CV High Performance Mass Flow Controllers (MFCs) are suited for accurate measurement and control of flow ranges between 0,14…7 ml_n/min and 0,4…20 l_n/min at operating pressures up to 100 bar. The MFC consists of a <u>thermal mass flow sensor</u>, 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. 0,14…7 ml_n/min max. 0,4…20 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)
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)	fast: < 500 msec standard: < 1 sec slow: < 2 sec
Control stability	≤ ± 0,1 % FS (typical for 1 ln/min N_2)
Operating temperature	-10 … 70 ℃
Temperature sensitivity	zero: < 0,02% FS/℃; span: < 0,025% Rd/℃
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

Measurement / control system

Attitude sensitivity	max. error at 90º off horizontal 0,07% FS at 1 bar, typical N_2
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_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)			
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
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

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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-211CVP (P-INSENSITIVE)

Min. flow 0,14…7 mln/min

Max. flow 0,4…20 ln/min

Pressure rating 100 bar

On-board pressure correction

100 selectable gases

EL-FLOW PRESTIGE FG-201CV

Min. flow 0,14…7 mln/min

Max. flow 0,4…20 ln/min

Pressure rating 64 bar

100 selectable gases

Customized I/O configurations

EL-FLOW PRESTIGE FG-211AV

Min. flow 0,4…20 ln/min

Max. flow 2…100 ln/min

Pressure rating 100 bar

100 selectable gases

Customized I/O configurations

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