

DATASHEET FG-201CSP

EL-FLOW Prestige FG-201CSP (P-Insensitive)

High Performance Mass Flow Controller with Integrated Shut-Off Valve



Gas Mass Flow Controllers with Electrical Shut-Off Valves

Bronkhorst® model FG-201CSP 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 between vacuum and 10 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-201CSP 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. For extra efficiency or safety, the FG-201CSP features an integrated, electrically operated shut-off 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. 0,14...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.
Settling time (in control, typical)	fast: < 500 msec standard: < 1 sec slow: < 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	< 0,02% Rd/bar typical N ₂

Measurement / control system

Max. Kv-value	6,5 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
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)	10 bar g
Pressure sensor	P-max: 15 bara; Burst pressure: 40 bara
Max. ΔP	5 bar dif.
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: Viton® options: EPDM, Kalrez® (FFKM) (N/C shut-off only)
Weight	1,5 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)			
Shut-off valve (N/C)	+24 Vdc 3 W; using a shut-off control adapter reduces the power consumption			
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

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 µm

Related products



EL-FLOW PRESTIGE FG-201CVP (P-INSENSITIVE)

Min. flow 0,14...7 mln/min

Max. flow 0,4...20 ln/min

Pressure rating 10 bar

On-board pressure
correction

100 selectable gases



EL-FLOW PRESTIGE FG-201CS

Min. flow 0,14...7 mln/min

Max. flow 0,4...20 ln/min

Pressure rating 10 bar

100 selectable gases

Integrated electrical shut-
off



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