

DATASHEET F-216AI

IN-FLOW High-Flow F-216AI

Industrial Style Mass Flow Controller for High Gas Flow



Industrial Style Gas Mass Flow Controllers for high flow rates

Bronkhorst® model F-216AI Mass Flow Controllers (MFCs) are suited for accurate measurement and control of flow ranges between 0,3...15 m³_n/h and 4...200 m³_n/h with 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. The IN-FLOW model is of rugged design (IP65) for use in industrial environments or even Zone 2 hazardous areas, with optional ATEX Cat. 3 or FM Class I, Div. 2 approval.

IN-FLOW 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.

Technical specifications

Measurement / control system

Flow range (intermediate ranges available)	min. 0,3...15 m ³ _n /h max. 4...200 m ³ _n /h (based on N ₂)
Accuracy (incl. linearity) (based on actual calibration)	± 1 % FS
Repeatability	< 0,2 % RD
Turndown ratio	1:50
Multi fluid capability	Storage of max. 8 calibration curves
Settling time (in control, typical)	2 ... 4 sec.
Control stability	< ± 0,1 % FS
Operating temperature	-10 ... +70 °C for ATEX cat. 3 and FM Class 1 Div 2 : 0...50°C
Temperature sensitivity	zero: < 0,05% FS/°C; span: < 0,05% Rd/°C
Pressure sensitivity	0,1% Rd/bar typical N ₂ ; 0,01% Rd/bar typical H ₂
Max. Kv-value	0,15 ... 1,5
Leak integrity, outboard	tested < 2 x 10 ⁻⁹ mbar l/s He
Attitude sensitivity	max. error at 90° off horizontal 0,2% at 1 bar, typical N ₂

Measurement / control system

Warm-up time	30 min. for optimum accuracy 2 min for accuracy $\pm 2\%$ FS
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Mechanical parts

Material (wetted parts)	stainless steel 316L or comparable
Pressure rating (PN)	100 bar abs
Max. ΔP	20 bar(d)
Process connections	compression type or face seal couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®
Weight	6,7 kg
Ingress protection	IP65

Electrical properties

Power supply	+15 ... 24 Vdc			
Max. power consumption	Supply	at voltage I/O	at current I/O	extra for fieldbus
	15 V	290 mA	320 mA	<75 mA
	24 V	200 mA	215 mA	<50 mA
Analog output	0...5 (10) Vdc or 0 (4)...20 mA (sourcing output)			
Digital communication	standard: RS232; options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS			

Electrical connection

Analog/RS232	8 DIN (male);
PROFIBUS DP	bus: 5-pin M12 (female); power: 8 DIN (male);
CANopen® / DeviceNet™	5-pin M12 (male);
FLOW-BUS/Modbus-RTU/ASCII	5-pin M12 (male)
Modbus TCP / EtherNet/IP / POWERLINK	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male);
EtherCAT® / PROFINET	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male)
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

Certification for hazardous areas

Approvals / certificates

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

A detailed view of a Bronkhorst EL-FLOW Performance flowmeter. The device is a compact, rectangular unit with a stainless steel body. It features a digital display screen on the right side, which shows the flow rate as '100.0 L/min' and '100.00 L/min'. The screen also displays 'EL-FLOW' and 'Bronkhorst'. The flowmeter has two ports on the left side, one for gas inlet and one for gas outlet, both with stainless steel fittings. The unit is labeled 'EL-FLOW Performance' and 'Bronkhorst'.

Three black power adapters with cables, arranged diagonally. Each adapter has a different input plug: a two-prong AC plug, a three-prong AC plug, and a car cigarette lighter plug. The cables are black and have different connectors at the other end: a standard USB-A plug, a USB-C plug, and a USB-A plug with a different internal wiring.

A stainless steel industrial flowmeter with a digital display. The display is mounted on a vertical plate and shows 'IN-FLOW' in red and '0.000' in black. Below the display is a red button with a white arrow pointing right and the word 'ENTER' below it. The flowmeter has two large horizontal pipes with flanges at each end. A grey cable is connected to the top of the display unit.

Min. flow 4...200 l/min
Max. flow 33...1670
l/min
Pressure rating 100 bar
Compact IP65 design
High accuracy and
repeatability

