

# EL-FLOW<sup>®</sup> Base

Mass Flow Controllers for Gases



## > Introduction

Bronkhorst High-Tech B.V., the European market leader in thermal Mass Flow Meters/Controllers and Electronic Pressure Controllers, has many years of experience in designing and manufacturing precise and reliable measurement and control devices. With a wide range of instruments, Bronkhorst offers innovative solutions for many different applications in a variety of different markets.

## > EL-FLOW<sup>®</sup> Base fast response Mass Flow Controllers for OEM applications

The Mass Flow Controllers of the EL-FLOW<sup>®</sup> Base series are standard and straightforward instruments. They provide accurate measurement, fast response and stable control in common gas flow applications. EL-FLOW<sup>®</sup> Base is an economical solution for installation in (OEM) systems e.g. in coating or welding applications. The instruments operate on the principle of thermal mass flow measurement in ranges starting from 0,2...10 ml<sub>n</sub>/min up to 4...200 l<sub>n</sub>/min air-equivalent. They offer analog I/O-signals as well as digital RS232 communication and/or Modbus-RTU as a standard feature. EL-FLOW<sup>®</sup> Base is a member of Bronkhorst's most popular and field proven EL-FLOW<sup>®</sup> series.

## > Fields of applications

- ◆ Process gas measurement and control in food, pharmaceutical and (petro-) chemical industries and fermentation installations
- ◆ Burner control (welding)
- ◆ Surface treatment (CVD, coating, hardening)
- ◆ Solar cell fabrication
- ◆ Analytical instrumentation

## > Models and flow ranges

Model	min. flow	max. flow
F-201CB	0,2...10 ml <sub>n</sub> /min	0,4...20 l <sub>n</sub> /min
F-201AB	0,4...20 l <sub>n</sub> /min	1,4...70 l <sub>n</sub> /min
F-202BB	1,4...70 l <sub>n</sub> /min	4...200 l <sub>n</sub> /min

*Ranges based on Air, intermediate ranges available.*

## > EL-FLOW<sup>®</sup> Base features

- ◆ Accurate mass flow measurement/control
- ◆ Fast response, excellent repeatability
- ◆ Virtually pressure and temperature independent
- ◆ Cost effective solution
- ◆ Analog I/O-signals: 0...5 (10) Vdc or 0(4)...20 mA
- ◆ RS232 communication
- ◆ Modbus-RTU or -ASCII
- ◆ Control characteristics digitally configurable by user



## > Technical specifications

### Performance

Accuracy (incl. linearity) (based on actual calibration)	: $\pm 1\%$ FS
Repeatability	: $< 0,2\%$ Rd
Settling time (controller)	: approx. 1 second
Control stability	: $< \pm 0,1\%$ FS (typical for $1 \text{ l}_v/\text{min N}_2$ )
Turndown	: 1 : 50 (2...100%)
Operating pressure	: 0...10 bar(g)
Operating temperature	: F-201CB/AB : 0...50°C; F-202BB : 10...50°C
Temperature sensitivity	: zero: $< 0,1\%$ FS/°C; span: $< 0,1\%$ Rd/°C
Warm-up time	: 30 min. for optimum accuracy
Leak integrity, outboard	: tested $< 2 \times 10^{-9}$ mbar l/s He
Control valve	: normally closed solenoid valve, F-201CB/F-201AB: $K_v\text{-max} = 6,6 \times 10^{-2}$ F-202BB: $K_v\text{-max} = 3,5 \times 10^{-1}$

### Mechanical parts

Material (wetted parts)	: Stainless Steel 316 or equivalent
Seals	: standard: Viton®; option: Kalrez® (FFKM)
Process connections	: $1/4$ " BSPF female thread; optional accessories: compression type or face seal couplings in various inch or metric sizes

### Electrical properties

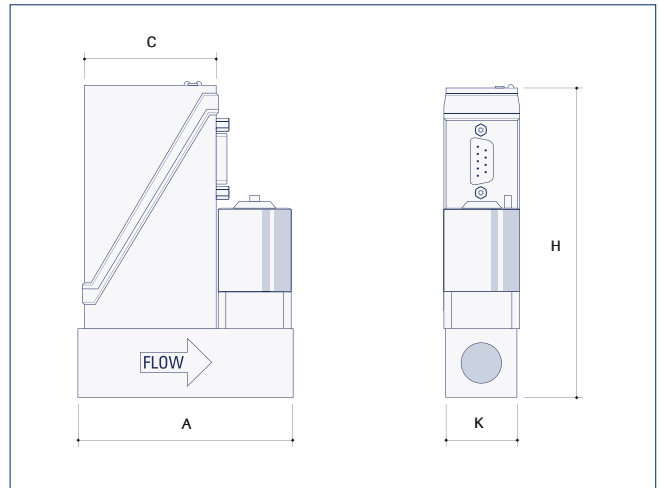
Power supply	: +15...24 Vdc
Power consumption	: max. 320 mA
Analog output/command	: 0...5 (10) Vdc or 0 (4)...20 mA (sourcing output)
Digital communication	: RS232 or Modbus-RTU or -ASCII (RS485)
Electrical connection	: 9-pin D-connector (male)
EMC	: EU declaration
Ingress protection (housing)	: IP40

Technical specifications subject to change without notice.



EL-FLOW® Base model F-201AB Mass Flow Controller

## > Dimensions and weights



Model	A	C	K	H	Weight (kg)
F-201CB	77	47	25	111	0,5
F-201AB	78	47	26	123	0,6
F-202BB	112	47	59	160	2,3

Dimensions in mm

## > Model number identification

F-NNNAA	-	NNNA	-	A	A	A	-	NN	-	A
<b>Base model</b>						<b>Analog output</b>				
F-201CB 0...10 ml <sub>v</sub> /min / 0...20 l <sub>v</sub> /min						A 0...5 Vdc				
F-201AB 0...20 / 0...70 l <sub>v</sub> /min						B 0...10 Vdc				
F-202BB 0...70 / 0...200 l <sub>v</sub> /min						F 0...20 mA sourcing				
						G 4...20 mA sourcing				
<b>Nominal range</b>						<b>Supply voltage</b>				
Factory selected						D +15...24 Vdc				
<b>Communication</b>						<b>Connections (in/out)</b>				
A Analog + RS232 or Modbus						0 none (factory standard)				
						<b>Seals</b>				
						V Viton® (factory standard)				
						K Kalrez®				

## > Warranty

All instruments and accessories are warranted for a period of 3 years from delivery date.

