Datasheet IQF-200C

Ultra Compact Mass Flow Controller for Gases

> Introduction

Bronkhorst® model IQF-200C Mass Flow Controllers (MFCs) are suited for precise control of dry, clean, non-corrosive gases. The MFC consists of a chip-based thermal mass flow sensor, a miniature control valve and a microprocessor based PID controller with signal conversion. As a function of a setpoint value, the flow controller swiftly adjusts the desired flow rate. The mass flow, expressed in normal milliliters per minute or per hour, is provided as analog signal or digitally via RS232/RS485. The flow range and orifice size for the control valve are determined depending of the type of gas and the process conditions of the application.

IQ+FLOW Mass Flow Controller model IQF-200C

> Technical specifications

Measurement / control system

Accuracy (incl. linearity) (Based on actual calibration)	: < ±1.5% RD + ±0.5% FS
Turndown	: 1 : 50
Multiple fluid capability	: storage of max. 8 calibration curves
Repeatability	: for flows < 20 ml_n/min: < ±0.5% FS; for flows > 20 ml_n/min: < ±0.5% RD
Settling time (in control)	: $\tau_{98\%}$ down to 300 msec, 700 msec typical
Max. Kv-value	: 2,3 x 10^{-3}
Max. ΔP across valve	: 9 bar dif
Control stability	: ≤ ± 0,2% FS
Temperature range	: 5…50°C
Temperature sensitivity	: span: ± 0,2% RD/°C; zero: 0,01 ml_n/min/°C
Leak integrity (outboard)	: < 1 x 10^{-8} mbar l/s He
Attitude sensitivity	: < 0,2 ml_n/min
Warm-up time	: negligible
Zeroing	: if required, the instrument must be zeroed at process conditions

Mechanical parts

Material (wetted parts)	: Aluminium, Si, SiOx, epoxy; option: stainless steel body
Pressure rating	: 10 bar g (150 psig)
Process connections (optional)	: 10-32 UNF threaded internal nut with 1/16" ferrule (SS316 or Peek); 1/16" or 1/8" compression type; other on request
Seals	: Viton®; other on request

Although all specifications in this datasheet are believed to be accurate, the right is reserved to make changes without notice or obligation.

Electrical specifications

Power supply	: +15…24 Vdc ±10%
Power consumption	: meter: max. 100 mA controller: max. 100 mA
Analog output (0…100%)	: 0…5 (10) Vdc, min. load impedance > 2 kΩ; 0 (4)…20 mA (sourcing), max. load impedance < 375 Ω
Analog setpoint (0…100%)	: 0…5 (10) Vdc, min. load impedance > 100 kΩ; 0 (4)…20 mA, load impedance ~250 Ω
Digital communication	: RS232 / RS485 (Modbus RTU/ASCII or FLOW-BUS)
Readout sample time	: 2 msec
Readout resolution	: 15 bits (0,003% FS)
Electrical connection	: RJ45 modular jack
Ingress protection	: IP40

> Ranges (based on Air)

I For standard calibration gases Air, N_2, H_2, He, Ar and CO_2*

Model	minimum	maximum
IQF-200C	0.2…10 sccm	0.1…5 slm

Intermediate ranges are available.
** Other dry, clean and non-corrosive gases on request (O_2, CO, …).*

II Conversion factors

Contrary to thermal mass flow meters/controllers with capillary tube, IQ+FLOW instruments contain a chip-based sensor. Due to the properties of this sensor we cannot apply our online conversion factor calculation tool at Fluidat on the Net. For optimum accuracy, Bronkhorst has to perform an actual calibration on the customer's fluid.

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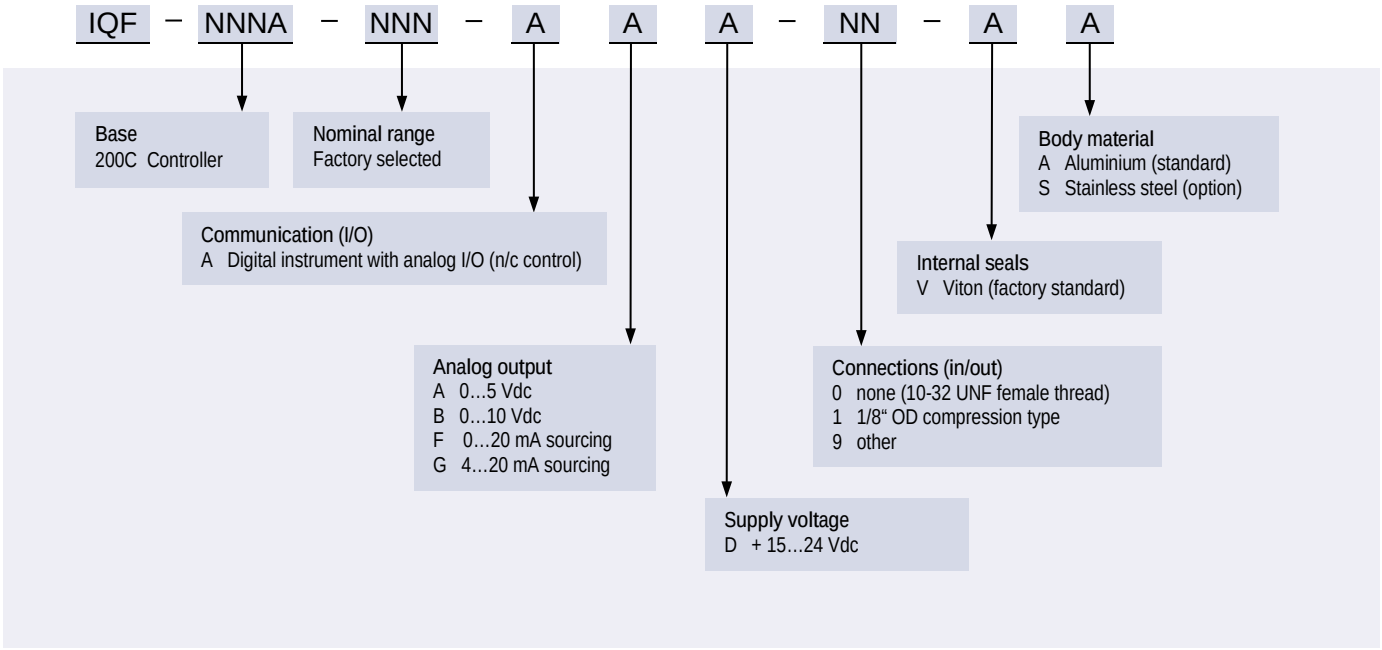
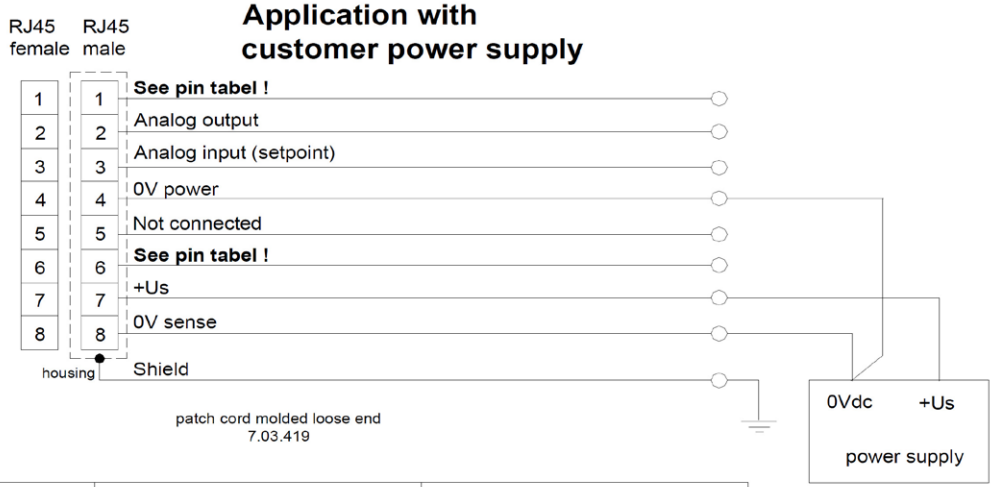
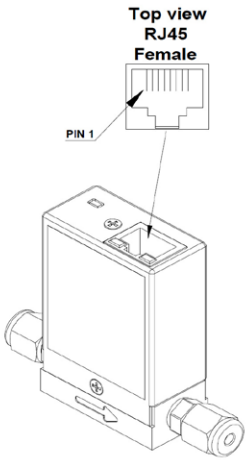
> Model number identification



> Hook-up diagram for analog or RS232 / RS485 communication

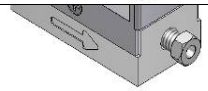
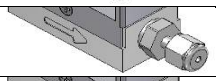
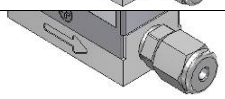


Pin tabel	Pin 1	Pin 6
RS-232	TX-RS-232	RX-RS-232
FLOW-BUS	RS-485 (-) FLOW-BUS B	RS-485 (+) FLOW-BUS A
Modbus	RS-485 (-) D0 Modbus (A/A')	RS-485 (+) D1 Modbus (B/B')



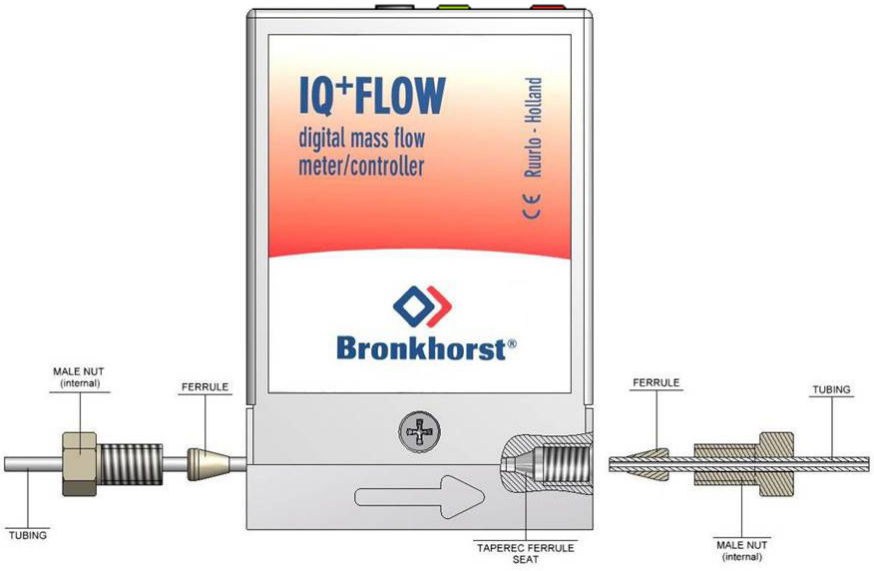
> Adapters

Following types of adapters are available on the market and can optionally be offered by Bronkhorst High-Tech and supplied as separately packed accessories:

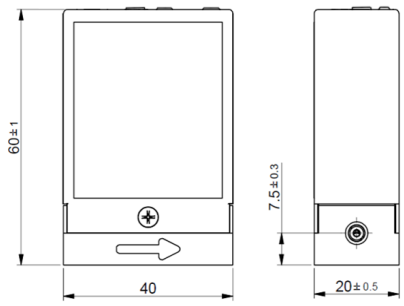
Adapter type	Tube size	Material	Example
Internal compression type male nut with single ferrule	1/16" OD	PEEK	
	1/16" OD	SS316 (SS body required)	
External compression type adapter with front+back ferrules	1/16" OD	Duplex	
	1/8" OD	Duplex	

Internal compression type male nut fittings

These PEEK or SS316 couplings are very common in chromatography applications. They are very compact, feature virtually zero dead volume and are suitable for high pressure applications.

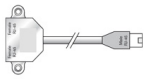


> Dimensions (mm) and weight (kg)



Weight: 0,2 kg

> Options and accessories

- Free software support for operation, monitoring, optimizing or to interface between digital instruments and MS-Windows software.	
- PiPS-MV Plug-in power supply RJ-45 (7.03.424)	
- Modular Y-adapter cable; T-part for connection of signal cable and PiPS (7.03.241)	
- Patch cable for I/O-signals and optionally for power (0,5 / 1 / 3 / 5 / 10 / 15 / 20 m)	
- RS232 cable for IQ+FLOW instruments, length 3 m., with 9-pin D-connector (7.03.426)	
- RJ45 to loose end cable, length 3 m., for power/signal connection by customer (7.03.419)	

> Alternatives

- IQ+FLOW model IQFD-200C, downported configuration	
- “IQM” IQ+FLOW manifold solutions; multi-channel and/or combination with other functional modules	
- EL-FLOW Series F-201CV MFC with thermal by-pass sensor	

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Bronkhorst High-Tech B.V. Nijverheidsstraat 1a, NL-7261 AK Ruurlo The Netherlands
T +31 (0)573 45 88 00 **I** www.bronkhorst.com **E** info@bronkhorst.com

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