DATASHEET D-6391-003BI-AND-D-6491-003BI

MASS-STREAM D-6391/003BI & D-6491/003BI MFC

Direct Thermal Mass Flow Controller for Gases, IP65 protected



IP65 Mass Flow Controllers for high flow rates of gases

Bronkhorst® model D-6391/003BI and D-6491/003BI Mass Flow Controllers (MFCs) are suited for precise measurement of flow ranges between 40… 2000 ln/min and 200…10000 ln/min at operating pressures between vacuum and 20 bar. The MFC consists of a proven inline thermal (CTA) mass flow sensor, a precise pilot-operated 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 instument is IP65 complient and can optionally be equipped with a modern, multi-functional and multi-colour display, with operator buttons on the instrument.

The digital MASS-STREAM™ series is characterized by a high degree of signal integrity and, as an option, up to 8 calibration curves of different gases and process conditions can be memorized in the instrument. 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. 40…2000 l_n/min max. 200…10000 l_n/min (based on N_2)
Accuracy (incl. linearity) (based on actual calibration)	± 1.0% RD plus ± 0.5% FS (at calibration conditions)
Repeatability	< 0,2 % FS
Turndown ratio	1:50
Type of gases	almost all gases, compatible with chosen materials
Response time (sensor)	approx. 0,9 sec.
Settling time (in control, typical)	< 5 sec.
Control stability	< 0,2 % FS typical
Operating temperature	0 … 50 °C
Storage / Transport conditions	with display : 0 … 50 °C, max. 95% RH (non-condensing); without display : -20 … +80 °C, max. 95% RH (non-condensing)
Temperature sensitivity	D-63xx : ±0,2% Rd/°C (Air) D-64xx : ±0,1% Rd/°C (Air)
Pressure sensitivity	±0,3% Rd/bar typical (Air)
Max. Kv-value	max. 8,2
Leak integrity, outboard	tested < 2 x 10^{-8} mbar l/s He

Measurement / control system

Attitude sensitivity	at 90° deviation from horizontal max. error 0,2 % at 1 bar typical N_2
Warm-up time	30 min. for optimum accuracy, within 30 seconds for accuracy ±4% FS

Mechanical parts

Sensor	Stainless steel SS 316 (AISI 316L)
Instrument body	Stainless steel SS 316
Sieves and rings	Stainless steel SS 316
Pressure rating (PN)	20 bar g
Max. ΔP	up to 20 bar d
Process connections	G1" (D-63xx : RP-type cavity / D-64xx : ISO1179-1 cavity) / compression type couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds
Weight	16,0 kg
Ingress protection	IP65

Electrical properties

Power supply	+15 … 24 Vdc			
Max. power consumption	Supply	Basic model	Add. for fieldbus	Add. for display
	15 V	300 mA	80 mA	30 mA
	24 V	200 mA	50 mA	20 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)
Modbus RTU / FLOW-BUS	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)

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



PIPS SERIES

Plug-in Power Supply

For lab-style or industrial devices

Interchangeable plugs (Euro, UK, USA, Australian, IEC) for mains connection

Related products



MASS-STREAM D-6390 MFM

- Min. flow 40…2000 ln/min
  Max. 100…10000 ln/min
- Pressure rating up to 20 bar
- Rugged sensor and housing (IP65)
- Optional integrated TFT display



MASS-STREAM D-6383/BJ-1 MFC

- Min. flow 17…500 ln/min
  Max. flow 167…5000 ln/min
- Pressure rating up to 16 bar
- Rugged sensor and housing (IP54)
- Optional integrated TFT display



MASS-STREAM D-6370 & D-6470 MFM

- Min. flow 2…100 ln/min
  Max. flow 10…1000 ln/min
- Pressure rating up to 20 bar
- Rugged sensor and housing (IP65)
- Optional integrated TFT display

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Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!