

DATASHEET D-6381-003BI-AND-D-6481-003BI

MASS-STREAM D-6381/003BI & D-6481/003BI MFC

Direct Thermal Mass Flow Controller for Gases, IP65 protected



IP65 Mass Flow Controllers for high flow rates of gases

Bronkhorst® models D-6381/003BI and D-6481/003BI Mass Flow Controllers (MFCs) are suited for precise measurement of flow ranges between 10... 500 l_n/min and 100...5000 l_n/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 instrument is IP65 compliant 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. 10...500 l _n /min max. 100...5000 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. 6,8 |

Measurement / control system

| | |
|--------------------------|---|
| Leak integrity, outboard | tested < 2×10^{-8} mbar l/s He |
| 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 $\pm 4\%$ 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®; option: EPDM, FFKM/Kalrez® |
| Weight | 9,3 kg |
| Ingress protection | IP65 |

Electrical properties

| | | | | |
|------------------------|--|-------------|-------------------|------------------|
| Power supply | +15 ... 24 Vdc $\pm 10\%$ | | | |
| 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

Certification for hazardous areas

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-6361/002BI & D-6461/002BI MFC

Min. flow 0,4...20 l/min
Max. flow 4...200 l/min
Pressure rating up to 20 bar
Rugged sensor and housing (IP65)
Optional integrated TFT display



MASS-STREAM D-6383/BJ-1 & D-6483/BJ-1 MFC

Min. flow 17...500 l/min
Max. flow 167...5000 l/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 l/min
Max. flow 10...1000 l/min
Pressure rating up to 20 bar
Rugged sensor and housing (IP65)
Optional integrated TFT display