

# DATASHEET D-6310-AND-D-6410

## MASS-STREAM D-6310 & D-6410 MFM

Direct Thermal Mass Flow Meter for Gases, IP65 protected



### Compact IP65 Mass Flow Meters for low flow rates of gases

Bronkhorst® models D-6310 and D-6410 Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 10...200 ml<sub>n</sub>/min and 0,1...2 l<sub>n</sub>/min at operating pressures between vacuum and 10 bar (Aluminium) or 20 bar (Stainless Steel). The MFM consists of a proven inline thermal (CTA) mass flow sensor and a microprocessor based pc-board with signal and fieldbus conversion and a PID controller for optional mass flow control by means of a separately mounted control valve. 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...200 ml <sub>n</sub> /min max. 0,1...2 l <sub>n</sub> /min (based on N <sub>2</sub> )
Accuracy (incl. linearity) (based on actual calibration)	± 1,0 % RD plus ± 0,5% FS (at calibration conditions)
Repeatability	< 0,2 % FS
Turndown ratio	1:20
Type of gases	almost all gases, compatible with chosen materials
Response time (sensor)	approx. 0,3 sec.
Operating temperature	0 ... 50 °C
Storage / Transport conditions	-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)
Leak integrity, outboard	tested < 2 x 10 <sup>-8</sup> mbar l/s He
Attitude sensitivity	at 90° deviation from horizontal max. error 0,2 % at 1 bar typical N <sub>2</sub>
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	D-63xx : Aluminium AL 50ST/51ST (anodised) or stainless steel SS 316 / D-64xx : Aluminium EN AW-6082-T6 (non-anodised) or stainless steel SS 316
Sieves and rings	Stainless steel SS 316
Pressure rating (PN)	10 bar g for instrument body in aluminium, 20 bar g for instrument body in stainless steel SS 316
Process connections	G1/4" (D-63xx : RP-type cavity / D-64xx : ISO1179-1 cavity) / compression type or face seal (VCR/VCO) couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds
Weight	Aluminium: 1,0 kg Stainless steel: 1,5 kg
Ingress protection	IP65

## Electrical properties

Power supply	+15 ... 24 Vdc ±10%			
Max. power consumption	Supply	Basic model	Add. for fieldbus	Add. for display
	15V	115 mA	80 mA	30 mA
	24V	85 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-6311 & D-6411 MFC

Min. flow 0,01...0,2  
l/min  
Max. flow 0,1...2 l/min  
Pressure rating up to 20  
bar  
Rugged sensor and  
housing (IP65)  
Optional integrated TFT  
display



### MASS-STREAM D-6320 & D-6420 MFM

Min. flow 0,05...1 l/min  
Max. flow 0,35...7 l/min  
Pressure rating up to 20  
bar  
Rugged sensor and  
housing (IP65)  
Optional integrated TFT  
display

