DATASHEET D-6360-AND-D-6460

MASS-STREAM D-6360 & D-6460 MFM

Direct Thermal Mass Flow Meter for Gases, IP65 protected

Compact IP65 Mass Flow Meters for medium flow rates of gases

Bronkhorst® models D-6360 and D-6460 Mass Flow Meters (MFMs) are suited for precise measurement of flow ranges between 0,4…20 ln/min and 2…200 ln/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 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. 0,4…20 l_n/min max. 2…200 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	up to 1:100
Type of gases	almost all gases, compatible with chosen materials
Response time (sensor)	approx. 0,9 sec.
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)
Leak integrity, outboard	tested < 2 x 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 ±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	G1/2" (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: 1,1 kg Stainless steel: 1,6 kg
Ingress protection	IP65

Electrical properties

Power supply	+15 … 24 Vdc ±10%			
Max. power consumption	Supply	Basic model	Add. for fieldbus	Add. for display
	15 V	115 mA	80 mA	30 mA
	24 V	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-6340 & D-6440 MFM

Min. flow 0,14…7 ln/min
Max. flow 0,5…50 ln/min

Pressure rating up to 20 bar

Rugged sensor and housing (IP65)

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

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

Min. flow 0,4…20 ln/min
Max. flow 4…200 ln/min

Pressure rating up to 20 bar

Rugged sensor and housing (IP65)

Optional integrated TFT display

Bronkhorst®

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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®!