DATASHEET F-232MX

EX-FLOW F-232MX

High-Pressure Mass Flow Controller for Gases, Ex-proof style



Intrinsically Safe Gas Mass Flow Controllers for High Pressure / High Delta-P

Bronkhorst® EX-FLOW Mass Flow Controllers (MFCs) are suited for precise gas flow control in ATEX Zone 1 hazardous areas. The flow meter part and the control valve of the MFC should be connected (via separate cables) to a power supply with galvanic isolation / preamplifier / readout system (located in the safe zone) which contains a controller board to complete the control loop. See Bronkhorst® E-8000 Series.

EX-FLOW model F-232MX covers flow ranges from 0,2...10 l_n/min up to 2...100 l_n/min (N_2-equivalent) at operating pressures up to 350 bar and max. 350 bar pressure difference (ΔP).

The intrinsically safe measuring head of the flow meter is tested according to ATEX 114 Directive 2014/34/EU and approved under EC-Type Examination Number: KEMA 01ATEX1172, protection II 2 G Ex ib IIC T4 Gb.
The intrinsically safe valve coils are explosion proof certified and available in two options (ATEX certification only):
Coil XB: protection II 1 G Ex ia IIC T6 / protection II 1 D Ex ta IIIC T80°C
Coil XC: protection II 2 G Ex eb IIC T4 / protection II 2 D Ex tb IIIC T130°C

Technical specifications

Measurement / control system

Flow range (intermediate ranges available)	min. 0,2…10 l_n/min max. 2…100 l_n/min (based on N_2)
Accuracy (incl. linearity) (based on actual calibration)	± 1 % FS
Repeatability	< 0,2 % RD
Turndown ratio	1:50 (2…100%)
Time constant	5 sec.
Control stability	≤ ± 0,1 % FS typical
Operating temperature	-10 … +65 °C
Temperature sensitivity	zero: < 0,05% FS/°C; span: < 0,05% Rd/°C
Leak integrity, outboard	tested < 2 x 10^{-9} mbar l/s He
Attitude sensitivity	max. error at 90° off horizontal 0,2% FS at 1 bar, typical N_2
Warm-up time	30 min. for optimum accuracy 2 min. for accuracy ± 2% FS

Mechanical parts

Material (wetted parts)	Stainless steel 316L or comparable
Pressure rating (PN)	350 bar abs
Min. ΔP	6 bar dif.
Max. ΔP	up to 350 bar dif.
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®
Ingress protection	IP65

Electrical properties

Output signal	15 … 20 mA (linear) Terminal connection, cable gland M16x1,5
I/O signals via PS/Readout (located in safe area)	analog: 0…5 Vdc, 0…10 Vdc, 0…20 mA, 4…20 mA; digital: RS232, PROFIBUS DP, DeviceNet™, Modbus RTU or ASCII, PROFINET EtherCAT®, FLOW-BUS
XB-coil	Coil voltage max. 28 V/110 mA; 295 Ohm at 20°C
XC-coil	Coil voltage max. 24 V; 65 Ohm at 20°C, Pmax = 9 W at 20°C

Electrical connection

Ex-proof measuring head	Terminal connection, cable gland M16x1,5
Control valve coil	cable gland M20x1,5

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



E-8000 SERIES

Digital Readout / Control Systems

- Bright, wide angle, 1.8" display (TFT technology)
- User friendly operation, menu driven with 4 push buttons

Related products



EX-FLOW F-132MX

- Flow ranges from 0,3…15 ln/min up to 5…250 ln/min
- Pressure rating 350 bar
- ATEX approval Cat.2, Zone 1
- Rugged IP65 construction



EX-FLOW F-231MX

- Min. flow 0,01…0,5 ln/min
  Max. flow 0,2…10 ln/min
- Pressure / ΔP up to 400 bar
- ATEX approval Cat.2, Zone 1
- Rugged IP65 construction

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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®!