

# F-211AX

## EX-FLOW F-211AX

Ex-Proof Mass Flow Controller for Gases

- ATEX approval Cat.2, Zone 1
- High accuracy, excellent repeatability
- Virtually pressure and temperature independent
- Compact design



### Intrinsically Safe Gas Mass Flow Controllers for low/medium flow rates

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-211AX covers flow ranges from 0,1...5 I<sub>N</sub>/min up to 2...100 I<sub>N</sub>/min (N<sub>2</sub>-equivalent) at operating pressures up to 100 bar.

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. 0,1...5 I <sub>n</sub> /min<br>max. 2...100 I <sub>n</sub> /min<br>(based on N <sub>2</sub> ) |
| Accuracy (incl. linearity) (based on actual calibration) | ± 1 % FS   |
| Repeatability  | < 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   |
| Max. Kv-value  | Valve with XB-coil: 4,3 x 10 <sup>-3</sup> /<br>Valve with XC-coil: 6,6 x 10 <sup>-2</sup>         |
| Leak integrity, outboard                                 | tested < 2 x 10 <sup>-9</sup> mbar l/s He  |
| Attitude sensitivity                                     | max. error at 90° off horizontal 0,2% FS at 1 bar, typical N <sub>2</sub>                          |
| Warm-up time   | 30 min. for optimum accuracy<br>2 min. for accuracy ± 2% FS  |

Mechanical parts

|                         |   |
|-------------------------|---|
| Material (wetted parts) | Stainless steel 316L or comparable  |
| Pressure rating (PN)    | 100 bar abs   |
| Process connections     | compression type or face seal (VCR/VCO) couplings   |
| Seals                   | standard: Viton®;<br>options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds |
| Weight                  | 1,7 kg  |
| Ingress protection      | IP65  |

Electrical properties

|   |  |
|---|--|
| Signal circuit                                    | type of explosion protection: intrinsic safety Ex ib IIC, only for connection to a certified intrinsically safe circuit with the following maximum values:<br>U <sub>i</sub> = 28 V, I <sub>i</sub> = 98 mA, P <sub>i</sub> = 686 mW<br>The effective internal capacitance between:<br>Terminals 1 and 3: C <sub>i</sub> = 1 nF;<br>Effective internal inductance: L <sub>i</sub> = 0,3 mH |
| Output signal                                     | 15 ... 20 mA (linear)  |
| I/O signals via PS/Readout (located in safe area) | analog: 0...5 Vdc, 0...10 Vdc, 0...20 mA, 4...20 mA;<br>digital: RS232, PROFIBUS DP, DeviceNet™, Modbus RTU or ASCII, PROFINET, EtherCAT®, FLOW- BUS   |
| XB-coil   | Coil voltage max. 28 V/110 mA;<br>295 Ohm at 20°C  |
| XC-coil   | Coil voltage max. 24 V;<br>65 Ohm at 20°C, P <sub>max</sub> = 9 W at 20°C  |

Electrical connection

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

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

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## 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



### IN-LINE FILTER SERIE M-411 RS

1/4" female in / male out

100 bar

Average porosity 0.5...15 µm

Related products



EX-FLOW F-211CX

Flow ranges from 0,3...15 mln/min up to 0,4...20 ln/min  
Pressure rating 100 bar  
ATEX approval Cat.2, Zone 1  
Rugged IP65 construction



EX-FLOW F-111AX

Flow ranges from 0,1...5 ln/min up to 2...100 ln/min  
Pressure rating 100 bar  
ATEX approval Cat.2, Zone 1  
Rugged IP65 construction



EX-FLOW F-211AX

Flow ranges from 0,1...5 ln/min up to 2...100 ln/min  
Pressure rating 100 bar  
ATEX approval Cat.2, Zone 1  
Rugged IP65 construction



BRONKHORST (UK) LTD  
1 Kings Court  
Willie Snaith Road  
Newmarket Suffolk CB8 7TG  
Tel. +44 1223 833712  
[sales@bronkhorst.co.uk](mailto:sales@bronkhorst.co.uk)

