

DATASHEET F-232M

EL-FLOW Select F-232M

High-Pressure Mass Flow Controller for Gases



Gas Mass Flow Controllers for high pressure / high delta-P

Bronkhorst® model F-232M Mass Flow Controllers (MFCs) are suited for accurate measurement and control of flow ranges between 0,2...10 l_n/min and 2...100 l_n/min at operating pressures up to 350 bar as well as max. 350 bar pressure difference (ΔP) . The MFC consists of a thermal mass flow sensor, a precise 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.

EL-FLOW® Select series are equipped with a digital pc-board, offering high accuracy, excellent temperature stability and fast response. The main digital pc-board contains all of the general functions needed for measurement and control. 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. 0,2...10 l _n /min max. 2...100 l _n /min (based on N ₂) |
| Accuracy (incl. linearity) (based on actual calibration) | ± 0,5 % RD plus ±0,1% FS |
| Repeatability | < 0,2 % RD |
| Turndown ratio | 1:50 |
| Multi fluid capability | Storage of max. 8 calibration curves |
| Settling time (in control, typical) | 2 ... 4 sec. |
| Control stability | < ± 0,1 % FS |
| Operating temperature | -10 ... +70 °C |
| Temperature sensitivity | zero: < 0,05% FS/°C; span: < 0,05% Rd/°C |
| Pressure sensitivity | < 0,1% Rd/bar typical N ₂ ; 0,01% Rd/bar typical H ₂ |
| Leak integrity, outboard | tested < 2 x 10 ⁻⁹ mbar l/s He |
| Attitude sensitivity | max. error at 90° off horizontal 0,2% 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® |
| Weight | 3,4 kg |
| Ingress protection | IP40 |

Electrical properties

| | | | | |
|------------------------|--|----------------|----------------|--------------------|
| Power supply | +15 ... 24 Vdc | | | |
| Max. power consumption | Supply | at voltage I/O | at current I/O | extra for fieldbus |
| | 15 V | 290 mA | 320 mA | <75 mA |
| | 24 V | 200 mA | 215 mA | <50 mA |
| Analog output | 0...5 (10) Vdc or 0 (4)...20 mA (sourcing output) | | | |
| Digital communication | standard: RS232; options: PROFIBUS DP, CANopen®, DeviceNet™, PROFINET, EtherCAT®, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK, FLOW-BUS | | | |

Electrical connection

| | |
|---|--|
| Analog/RS232 | 9-pin D-connector (male); |
| PROFIBUS DP | bus: 9-pin D-connector (female); power: 9-pin D-connector (male); |
| CANopen® / DeviceNet™ | 5-pin M12-connector (male); |
| FLOW-BUS/Modbus-RTU/ASCII | RJ45 modular jack |
| Modbus TCP / EtherNet/IP / POWERLINK | 2 x RJ45 modular jack (in/out); |
| EtherCAT®/ PROFINET | 2 x RJ45 modular jack (in/out) |

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



BRIGHT SERIES

Compact Local R/C Module

Bright, wide angle, 1.8" display
User friendly operation
Indication/operation/configuration



PIPS SERIES

Plug-in Power Supply

For lab-style or industrial devices
Interchangeable plugs (Euro, UK, USA, Australian, IEC) for mains connection