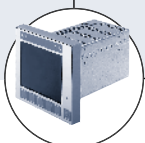


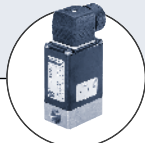
Mass Flow Controller (MFC) for gases



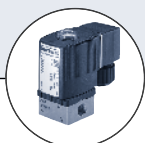
Type 8711 can be combined with...



Type 1150
Multi-channel
programme controller



Type 0330
3/2 or 2/2-
way valve



Type 6013
2/2-way valve



MFC
Configuration
software

Type 8711 is a unit for the control of the mass flow of gases that is relevant for most applications in Process Technology. The measured value provided by the sensor (see the description on page 2) will be compared in the digital regulation electronics with the predefined set point according to the signal; if a control difference is present, the control value output to the proportional valve will be modified using a PI-control algorithm. Due to the fact that the

sensor is directly in the bypass channel a very fast settling time of the MFC is reached. In this way, the mass flow can be maintained at a fixed value or a predefined profile can be followed, regardless of pressure variations or other changes in the system. Type 8712 can optionally be calibrated for two different gases, the user is able to switch between these two gases. As the control element, a proportional valve working at low friction guarantees a high sensitivity and the

good control characteristics of the unit. Typical application areas are gas dosing or rather the production of gas mixtures in:

- Process technology
- Packaging and foodstuff industry
- Environmental technology
- Surface treatment
- Material coating
- Burner controllers
- Fuel cell technology

Technical data

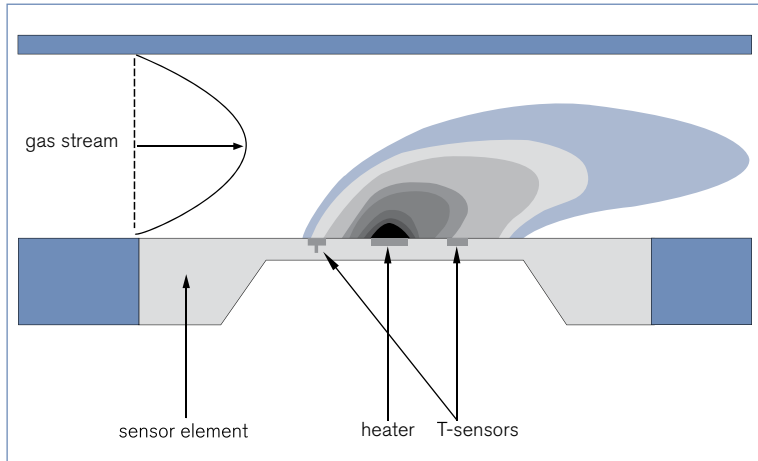
| | |
|---|---|
| Full scale ranges¹⁾ (Q_{nom}) | 0.02 to 50 l _N /min N ₂ equivalent |
| Operating media M | neutral, non-contaminated gases, other gases on request |
| Max. operating pressure (inlet pressure) | 145 PSI (10 bar) depending on the orifice of the valve |
| Calibration medium | operating gas or air w/ conversion factor |
| Medium temperature | 14°F to 158°F (-10°C to 70°C) |
| Ambient temperature | 14°F to 131°F (-10°C to 50°C) |
| Accuracy (after 1 min. warm up time) | ±0.8% of rate ±0.3% F.S. |
| Linearity | ±0.1% F.S. |
| Repeatability | ±0.1% F.S. |
| Control range | 1:50; 1:500 on request |
| Settling time ($t_{95\%}$) | <300 ms |
| Body material | aluminium |
| Electronics housing material | chromium plated steel sheet |
| Sealing material | FKM, EPDM (others on request) |
| Port connections | NPT 1/4, or screw-in fitting, others on request |
| Control valve (proportional valve) valve orifice K _{v6} -value | valve is closed when power is off 0.05 to 1.6 mm 0.0002 to 0.05 m ³ /h |
| Electr. connection | 15-pin sub-D plug |

| | |
|---|---|
| Power supply | 24V DC |
| Voltage tolerance | ±10% |
| Residual ripple | <5% |
| Power consumption | max. 400 mA at 24V DC |
| Set point Feed impedance | 0–5 V, 0–10 V, 0–20 mA or 4–20 mA > 20 K Ω (voltage), < 300 Ω (current) |
| Output signal Max. current, volt. output Max. load, current output | 0–5 V, 0–10 V, 0–20 mA or 4–20 mA 10 mA 600 Ω |
| Digital communication | RS232 or RS485, adapter needed |
| Protection class | IP65 |
| Dimensions [mm] | 107 x 114 x 28 mm (without fitting) |
| Total weight | 2.2 lbs. (1000 g) |
| Mounting position | horizontal or vertical |
| Light emitting diode display (Default, other allocations possible) | Indication for Power, Limit, Error |
| Binary input (Default, other functions possible) | two 1. start autotune 2. not assigned |
| Binary output (Default, other functions possible) | one relay-output for 1. setpoint not reached max. load 25 V, 1 A, 25 VA |
| Certification (see operating instructions) | various environmental tests, electromagnetic compatibility |

¹⁾ at reference conditions 1.013 bar(a) and 32°F (0°C)

Technical data

Functional principle of the registration of the measured values



The actual flow rate is detected by a sensor operating according to a thermal principle which has the advantage of delivering the mass flow without any corrections for pressure or temperature being needed.

A small part of the total gas stream is diverted into a small, specifically designed bypass channel, that ensures laminar flow conditions. The sensor element is a chip immersed into the wall of this channel. The chip, produced in CMOS technology, contains a heating resistor and two temperature sensors (thermopiles) being arranged symmetrically upstream and downstream of the heater. The differential voltage of this thermopiles is a measure of the mass flow rate passing this bypass channel. The calibration procedure effectuates a unique assignment of the sensor signal to the total flow rate passing the device.

Notes regarding the selection of the unit

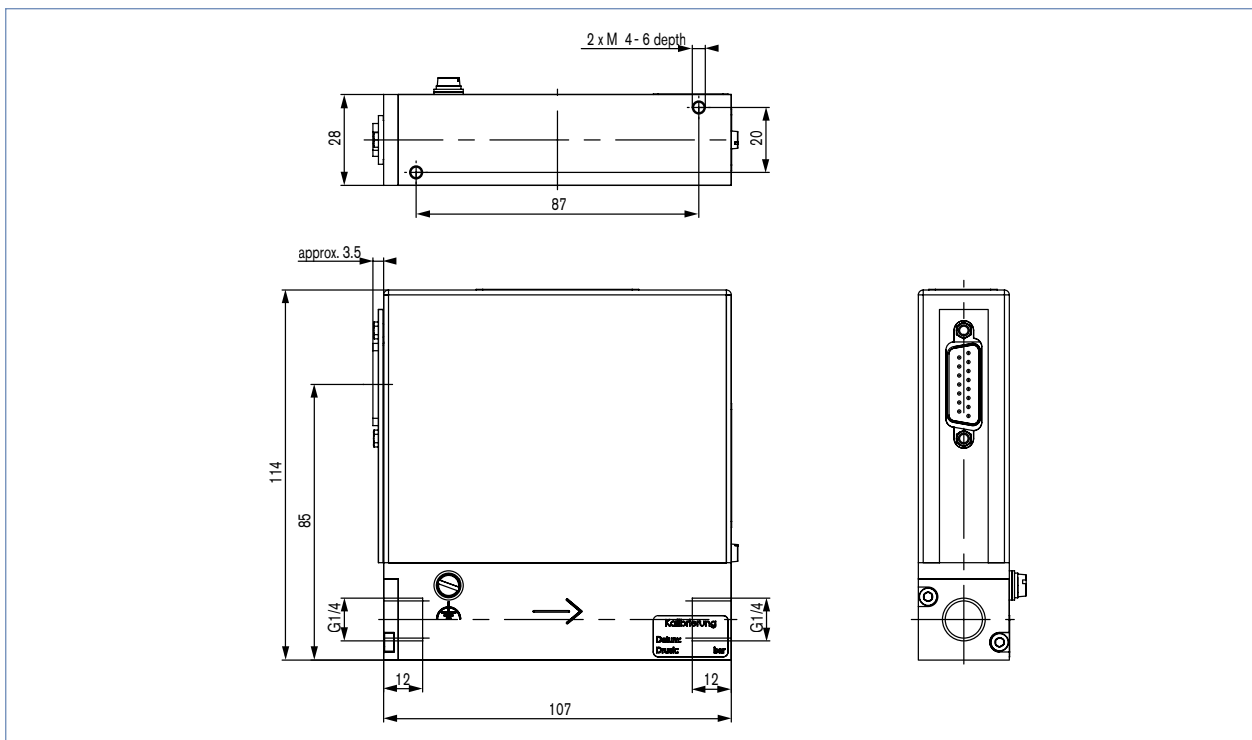
For the proper choice of the actuator orifice within the MFC, not only the required maximum flow rate Q_{nom} , but also the pressure values *directly* before and after the MFC (p_1, p_2) at this flow rate Q_{nom} should be known. In general, these pressures are not the same as the overall inlet and outlet pressures of the whole plant, because usually there are additional flow resistors (tubing, additional shut-off valves, nozzles etc.) present both before and after the controller.

Please use the specification sheet (p. 4) to indicate the pressures

directly before and after the MFC. If these should be unknown or not accessible to a measurement, estimates are to be made by taking into account the approximate pressure drops over the flow resistors before and after the MFC, respectively, at a flow rate of Q_{nom} . In addition, please quote the maximum inlet pressure $p_{1,max}$ to be encountered. This data is needed to make sure the actuator is able to provide a close-tight function within all the specified modes of operation.

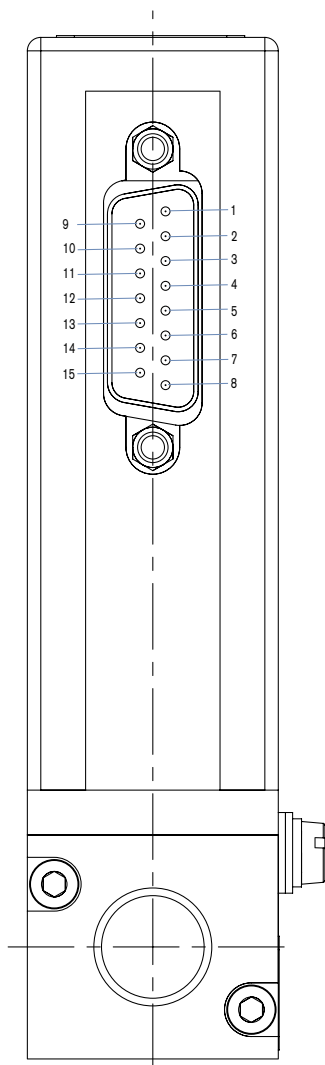
The questionnaire on page 4 contains the relevant fluid specification. Please use in this way the experience of Bürkert engineers already in the design phase and provide us with a copy of the questionnaire containing the data of your application together with your inquiry or order.

Dimensions [mm]



DTS 1000082497 EN Version: - Status: RL (released | freigegeben | validé) printed: 13.08.2008

PIN configuration



15-pin Sub-D plug

| Pin | Connection |
|-----|---------------------------------------|
| 1 | relay, NC contact |
| 2 | relay, NO contact |
| 3 | relay, C contact |
| 4 | GND 24V–supply and binary inputs |
| 5 | supply +24V |
| 6 | 8V output (only internal company use) |
| 7 | set–valve input GND |
| 8 | set–valve input + |
| 9 | actual value output GND |
| 10 | Actual value output + |
| 11 | DGND (for RS232) |
| 12 | binary input 1 |
| 13 | binary input 2 |
| 14 | RS232 RxD (without driver) |
| 15 | RS232 TxD (without driver) |

Ordering table for a accessories (connectors are not included in the delivery)

| Article | Item no. |
|--|----------------------------|
| 15-pin electrical connection | |
| Sub-D plug 15-pin solder connection | 918 274 |
| Sub-D hood for Sub-D socket, with screw locking | 918 408 |
| Sub-D plug 15-pin with 5m cable, ass. on one side | 787 737 |
| Sub-D plug 15-pin with 10m cable, ass. on one side | 787 738 |
| Adapter | |
| RS232-adapter – for connection to a PC | 654 748 |
| PC cable for RS232 9-pin socket/plug 2m | 917 039 |
| Adapter RS485 | 654 538 |
| Communication software “MassFlowCommunicator” | Info at www.burkert.com |

Specification sheet for MFC/MFM applications

▶ Please copy and fill in or download the electronic version at www.burkert-usa.com and send to your local Burkert Sales Center with your inquiry or order

| | | | |
|---|---|---|--|
| <input type="checkbox"/> MFC-application | <input type="checkbox"/> MFM-application | <input type="text"/> Quantity | <input type="text"/> Desired delivery date |
| Medium Data | | | |
| Type of gas (or gas proportion in mixtures) | <input type="text"/> | | |
| Density [kg/m ³] ¹⁾ | <input type="text"/> | | |
| Medium temperature [°C or °F] | <input type="text"/> °C | <input type="text"/> °F | |
| Moisture content [g/m ³] | <input type="text"/> | | |
| Abrasive components/solid particles | <input type="checkbox"/> no | <input type="checkbox"/> yes, as follows <input type="text"/> | |
| Fluidic Data | | | |
| Maximum flow Q _{nom} | <input type="text"/> l _N /min ¹⁾ | <input type="text"/> cm _N ³ /min ¹⁾ | |
| | <input type="text"/> m _N ³ /h ¹⁾ | <input type="text"/> cm _s ³ /min (sccm) ²⁾ | |
| | <input type="text"/> kg/h | <input type="text"/> l _s /min (slpm) ²⁾ | |
| Minimum flow Q _{min} | <input type="text"/> l _N /min ¹⁾ | <input type="text"/> cm _N ³ /min ¹⁾ | |
| | <input type="text"/> m _N ³ /h ¹⁾ | <input type="text"/> cm _s ³ /min (sccm) ²⁾ | |
| | <input type="text"/> kg/h | <input type="text"/> l _s /min (slpm) ²⁾ | |
| Inlet pressure at Q _{nom} | p ₁ = <input type="text"/> barg or | <input type="text"/> psig ■ | |
| Outlet pressure at Q _{nom} | p ₂ = <input type="text"/> barg or | <input type="text"/> psig ■ | |
| Max. inlet pressure p _{1max} | <input type="text"/> barg or | <input type="text"/> psig ■ | |
| Pipe run (external-Ø) | <input type="text"/> metric mm | <input type="text"/> imperial, inch | |
| MFC/MFM-port connection (1/4"- internal thread or screw-in fitting) | <input type="checkbox"/> without screw-in fitting <input type="checkbox"/> NPT-thread (ANSI B1.2) <input type="checkbox"/> G-thread (DIN ISO 228/1) <input type="checkbox"/> with screw-in fitting | | |
| Ambient temperature | <input type="text"/> °F | | |
| Material Data | | | |
| Body Material | <input type="checkbox"/> Stainless steel | | |
| Sealing material | <input type="checkbox"/> FKM | <input type="checkbox"/> EPDM | Other: <input type="text"/> |
| Electrical Data | | | |
| Output/input signal | <input type="checkbox"/> 0-20 mA/0-20 mA | <input type="checkbox"/> 4-20 mA/4-20 mA | |
| | <input type="checkbox"/> 0-10 V/0-10 V | <input type="checkbox"/> 0-5 V/0-5 V | |
| Fieldbus communication | <input type="checkbox"/> Profibus-DP | <input type="checkbox"/> DeviceNet | |
| ■ Please quote all pressure values as overpressures with respect to atmospheric pressure [barg] | | | |

1) at: 14.7 PSI and 32°F (1.013 bar(a) and 0°C) 2) at: 14.7 PSI and 68°F (1.013 bar(a) and 20°C)

▶ Please do not forget to fill in the customer data below

| | |
|-----------------------|----------------|
| Company | Contact person |
| Customer No. | Department |
| Address | Tel./Fax |
| ZIP Code/Town/Country | E-mail |

In case of special application conditions, please consult for advice.

We reserve the right to make technical changes without notice.

0602/1_US-en