Mass Flow Meter for gases **Type 8700**

Bypass-MFM, digital electronics, for nominal flow-rates from 50 ml_N/min to 30 l_N/min

PRODUCT INFORMATION

TECHNICAL DATA

Full scale ranges [1] (Q_{nom})	0.05 to 30 l_N/min ref. medium N_2	**Electrical connection**	15-pole Sub-D plug
Operating media	neutral, non-contaminated gases, others on request	**Power supply**	24V DC
		Voltage tolerance	±10%
		Residual ripple	<5%
Max. oper. pressure (Inlet pressure)	10 bar	**Power consumption**	max. 100 mA
		Output signal (Actual value output)	0-5 V, 0-10 V, 0-20 mA or 4-20 mA
Calibration medium	operating gas or N_2 with conversion factor	Max. current, volt. out.	10 mA
		Max. load, current out.	600 Ω
Medium temperature	-10 to +70°C	**Protection class**	IP50
Ambient temp.	-10 to +55°C	**Dimensions [mm]** (without fittings)	80 x 109 x 25 (see drawing)
Accuracy (after 15min warm up time)	±1.5% of Rdg. ± 0.5% F.S.	**Total weight**	600g
		Mounting position	horizontal or vertical
Linearity	±1% v. E.	**LED display** (Default, other allocations possible)	status display for Power, Limit and Error
Repeatability	±0.5% v. E.		
Control range	1:50		
Response time ($t_{95\%}$)	<2 s	**Binary input**	two, different functions possible - with Default not assigned
Body material	stainl. steel 1.4305		
Electronics housing material	chromium plated steel sheet		
Sealing material	FPM, EPDM, others on request	**Binary output** (Default, other functions possible)	relay output for Q_{nom} almost reached, loading: max. 25V, 1A, 25VA
Port connection	G1/4 or with screw-in fitting for 6mm, 8mm or 1/4“ pipe, others on request	**Certification**	different environmental testing, electromagnetic compatibility

[1] at standard conditions 1.013 bar(a) and 273 K

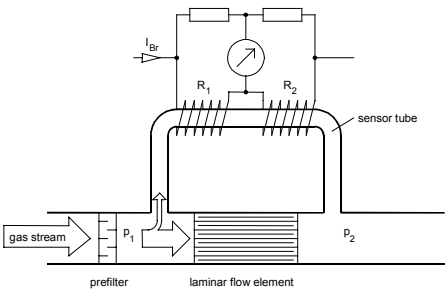
Please use the specification sheet for MFC / MFM applications on page 3 for your query.

Functional principle

Flow sensors of the MFC type 8700 work according to an anemometric measuring procedure, which delivers the mass-flow value directly. Additional variables, such as the density, do not need to be measured or to be taken into consideration.

The measurement is carried out the Bypass principle. A laminar flow element in the main channel generates a small pressure drop that drives a small portion of the total flow that is proportional to this through the Bypass channel. The Bypass channel consists of a thin stainless steel tube onto which the two heating resistances R_1 and R_2 are wound. These heating resistances are connected to a measuring bridge (see illustration). When flow is taking place, heat will be transported in the direction of flow and will thereby unbalance the measurement bridge, which had previously been balanced.

The dynamic character of the measurement is determined by the sides of the sensor tubing, which act as a thermal barrier and is, in principle, worse than sensors whose resistances are located directly in the main flow. Using software algorithms, response times are achieved which are sufficient for most applications. For applications with higher dynamic requirements, MFMs with inline sensors (Types 8006 and 8706) or bypass sensors using the CMOSens® technology (Typ 8702) should therefore be used.



Upstream filters are recommended for polluted media, in order to avoid a change of the division ratio between the main and the auxiliary flow and in the heat transfer due to deposition on the sides of the sensor tubing

DESCRIPTION

Mass flow meters are used in Process Technology for the direct measurement of gas flows. In the case of volumetric flow meters, it is also necessary to measure the temperature and the pressure and the density respectively, because gases change their density depending on the pressure and the temperature. The measurement of the mass flow, on the other hand, is independent of the pressure and the temperature.

The digital mass flow meter type 8700 outputs a standard analogue signal of the actual flow rate. The measurement of the mass flow takes place as described alongside.

The materials of the parts that come into contact with the medium are selected according to customer specification so that the device can be operated with the complete range of standard process gases.

Typical applications are gas flow measurement in

- test benches,
- environmental technology,
- medical technology and
- analysis technology.

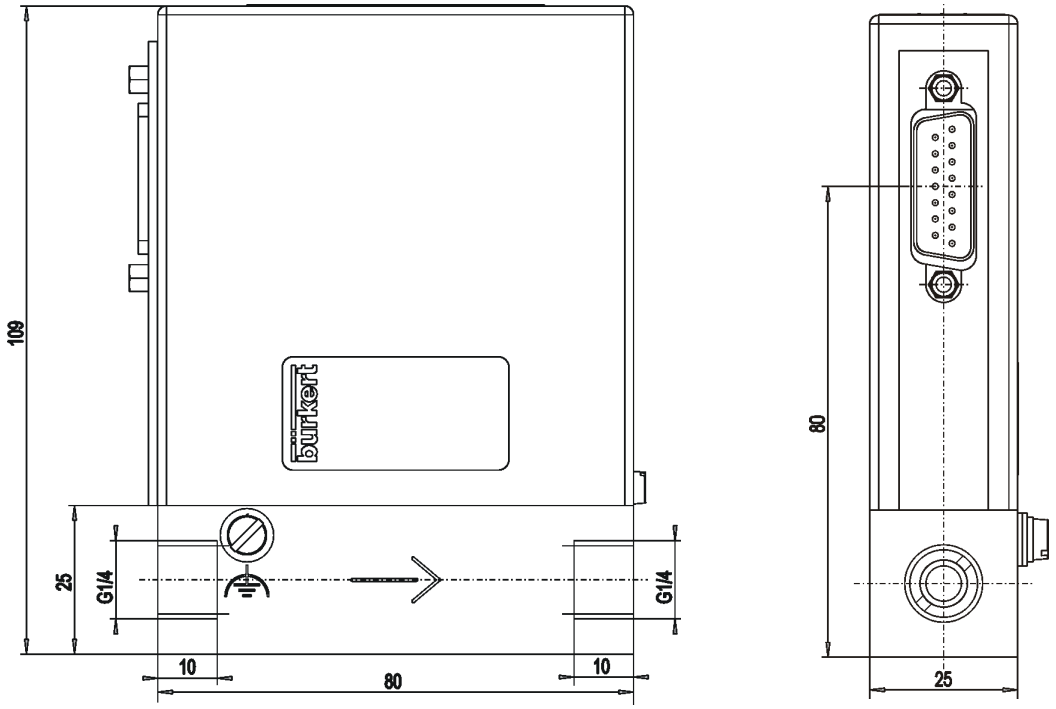
bürkert
Fluid Control Systems

Notes regarding the selection of the device

The decisive factors for the perfect functioning of an MFM within the application is the fluid compatibility, the maximum inlet pressure and the correct choice of the flow meter range. The pressure drop over the MFM is dependent on the nominal flow and the operating pressure, and is a maximum of 30 mbar.

Please use the form on page 3 for the design data.

DIMENSIONS [mm]



PIN CONFIGURATION
15-pole Sub-D Plug

PIN	Connection
1	relay, NC contact
2	relay, NO contact
3	relay, C contact
4	supply GND
5	supply +24V
6	8V output (only company internal use)
7	not used
8	not used
9	actual value output GND
10	actual value output +
11	GND (for binary inputs)
12	binary input 1
13	binary input 2
14	connection to a PC only over adapter (see accessories)
15	

Specification sheet for MFC / MFM applications

Please copy, fill in and send to your local Bürkert Sales Centre with your inquiry or order.

Design data for MFC- ☐/ MFM- ☐ applications,
Quantity: _____, Desired delivery date: _____

MEDIUM DATA	**Please fill in and mark the respective boxes with a cross**	
Type of gas (or gas proportion in mixtures)		
Density	_____ kg/ m^3	
Medium temperature	_____ ☐ °C or ☐ °F	
Moisture content	_____ g/ m^3	
Abrasive components / solid particles	☐ no ☐ yes, as follows:	
FLUIDIC DATA		
Maximum flow Q_{nom}	☐ _____ l_N/min ☐ _____ m_N^3/h ☐ _____ kg/h	☐ _____ cm_N^3/min ☐ _____ cm_s^3/min (sccm) ☐ _____ l_s/min (slpm)
Minimum flow Q_{min}	☐ _____ l_N/min ☐ _____ m_N^3/h ☐ _____ kg/h	☐ _____ cm_N^3/min ☐ _____ cm_s^3/min (sccm) ☐ _____ l_s/min (slpm)
Inlet pressure at Q_{nom} Outlet pressure at Q_{nom}	p_1 = _____ ☐ barg or ☐ psig ■ p_2 = _____ ☐ barg or ☐ psig ■	
Max. inlet pressure p_{1max}	_____ ☐ barg or ☐ psig ■	
Pipe run (external-∅)	☐ metric, _____ mm ☐ imperial, _____ inch	
MFC-/MFM-port connection (1/4"-3/4"-internal thread or screw-in fitting)	☐ without screw-in fitting, _____ inch ☐ G-thread (DIN ISO 228/1) ☐ NPT-thread (ANSI B1.2) ☐ with screw-in fitting	
Mounting position of the MFC/MFM	☐ horizontal, valve on top (standard) ☐ horizontal, valve on side ☐ vertical, flow upwards ☐ vertical, flow downwards	
Ambient temperature	_____ °C	
MATERIAL DATA		
Body material	☐ Aluminium (anodized) ☐ Stainless steel	
Sealing material	☐ FPM (Viton) ☐ EPDM ☐ other:	
ELECTRICAL DATA		
Output/input signal	☐ 0-20mA / 0-20mA ☐ 4-20mA / 4-20mA ☐ 0-10V / 0-10V ☐ 0-5V / 0-5V	

■ Please quote all pressure values as **overpressures with respect to atmospheric pressure [barg]**.

Please don't forget the customer data!

Company	Contact person
Customer No.	Department
Address	Tel. / Fax
Postcode / Town	E-mail