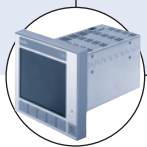




## Mass Flow Meter (MFM) for gases

- Bypass MFM with CMOSens®, technology for nominal flow rates from 20 mlN/min to 50 lN/min
- High accuracy
- Fast response time
- Fieldbus option

Type 8702 can be combined with...



**Type 1150**

Multi-channel  
program controller



**Type 0330**

3/2 or 2/2-way valve



**Type 6013**

2/2-way valve



**MFC**

Configuration software

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

The digital mass flow meter Type 8702 uses a sensor on silicon chip basis (see the description on page 2) located directly in the bypass channel. Due to the fact that the sensor is directly in the bypass channel a very fast response time of the MFM is reached. The actual flow is given as an analog output signal or could be read out over Fieldbus communication.

Type 8702 can optionally be calibrated for two different gases, the user is able to switch between these two gases.

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

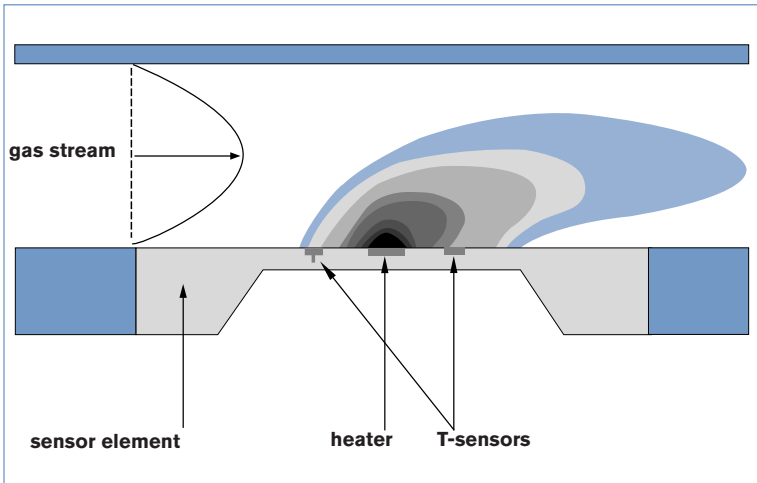
Typical application areas are gas flow measurement in

- Test benches
- Packaging and foodstuff industry
- Environmental technology
- Medical technology and
- Analysis technology

Technical Data			
<b>Full scale ranges<sup>1)</sup></b> (Q <sub>nom</sub> )	0.02 to 50 lN/min N <sub>2</sub> equivalent	<b>Voltage tolerance</b>	±10%
<b>Operating media</b> M	neutral, non-contaminated gases, other gases on request	<b>Residual ripple</b>	<5%
<b>Max. operating pressure</b>	10 bar (145 psi)	<b>Power consumption</b>	max. 2.5 W at 24V DC, max. 5 W at 24V DC with Fieldbus communication
<b>Max. pressure drop</b>	30 mbar	<b>Output signal</b>	0–5 V, 0–10 V, 0–20 mA or 4–20 mA
<b>Calibration medium</b>	operating gas or air with conversion factor	Max. current, volt. output	10 mA
<b>Medium temperature</b>	-10 to +70°C	Max. load, current output	600 Ω
<b>Ambient temperature</b>	-10 to +50°C	<b>Fieldbus communication</b>	Profibus-DP, DeviceNet, others on request
<b>Accuracy</b> (after 1 min. warm up time)	±0.8% of rate ±0.3% F.S.	<b>Protection class</b>	IP65
<b>Linearity</b>	±0.1% F.S.	<b>Dimensions [mm]</b> (without fitting)	115 x 137.5 x 37 mm
<b>Repeatability</b>	±0.1% F.S.	<b>Total weight</b>	1000 g
<b>Control range</b>	1:50; higher span on request	<b>Mounting position</b>	horizontal or vertical
<b>Response time (t<sub>95%</sub>)</b>	<300ms	<b>Light emitting diodes</b> (Default, other allocations possible)	indication for Power, Communication, Limit, Error
<b>Body material</b>	stainless steel 1.4305	<b>Binary input</b>	three, different functions possible – with Default not assigned
<b>Electr. housing material</b>	PBT	<b>Binary output</b> (Default, other functions possible)	two relay-outputs for 1. Limit (Q <sub>nom</sub> almost reached) 2. error (e.g. sensor fault) max.load: 60 V, 1 A, 60 VA
<b>Sealing material</b>	FKM, EPDM, others on request	<b>Certification</b> (see operating instructions)	various environmental testing, electromagnetic compatibility
<b>Port connections</b>	G 1/4, NPT 1/4 or screw-in fitting		
<b>Electr. connection</b>	round socket sub-HD socket Fieldbus comm.		
<b>Power supply</b>	24V DC		

<sup>1)</sup> at reference conditions 1.013 bar(a) and 0°C

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.

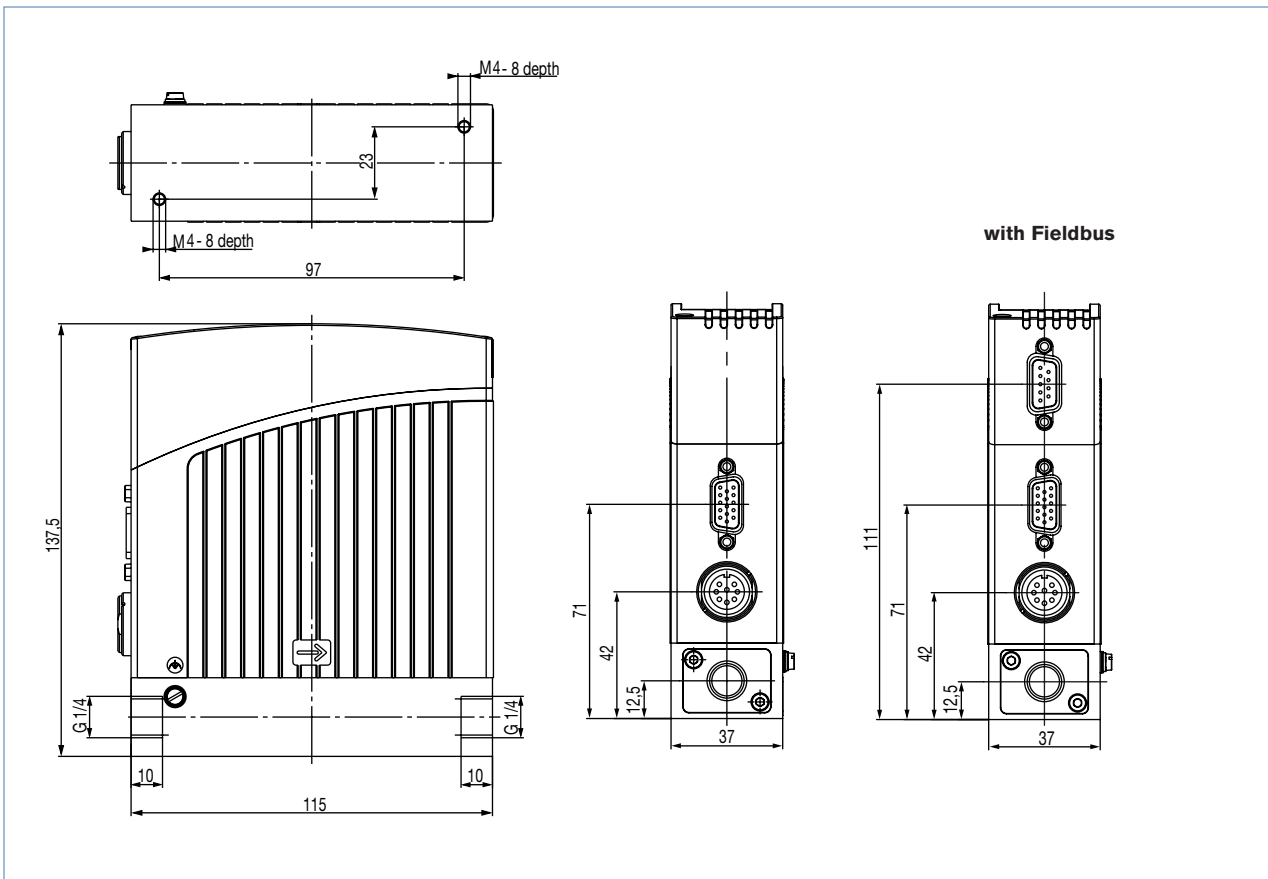
A small part of the total gas stream is diverted into a small, specifically designed bypass channel, that ensures laminar flow conditions. The sensor element is a chip immersed into the wall of this channel. The chip, produced in CMOS technology, contains a heating resistor and two temperature sensors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

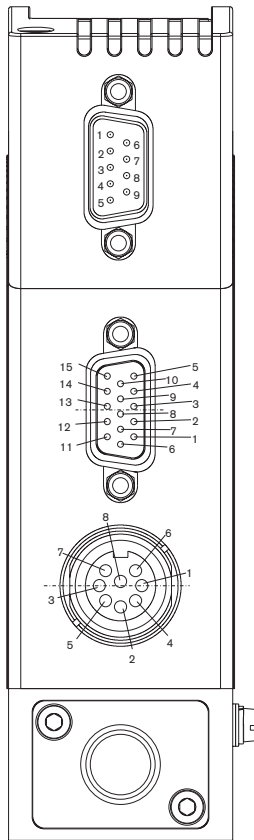
The decisive factors for the perfect functioning of an MFM within the application are the fluid compatibility, the normal inlet pressure and the correct choice of the flow meter range. The pressure drop over the MFM depends on the flow rate and the operating pressure.

The questionnaire on page 4 contains the relevant fluid specification. Please use in this way the experience of Burkert 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]



## PIN Configuration



## 9-pin Sub-D socket

## with Profibus-DP

Pin	Connection
1	shield
2	not used
3	RxD/TxD - P (B-line)
4	RTS (control signal for repeater)
5	GND
6	VDD
7	not used
8	RxD/TxD - N (A-line)
9	not used

## with DeviceNet

Pin	Connection
1	shield
2	CAN_L
3	GND
4	not used
5	not used
6	not used
7	CAN_H
8	not used
9	not used

## 15-pin Sub-HD socket

Pin	Connection
1	not used
2	not used
3	signal output +
4	binary input 2
5	12V-output (only company internal use)
6	RS232 TxD (direct connection to PC)
7	binary input 1
8	DGND (for binary inputs)
9	only company internal use (do not connect!)
10	12V-output (only company internal use)
11	12V-output (only company internal use)
12	binary input 3
13	signal output GND
14	RS232 R x D (direct connection to PC)
15	DGND (for RS232)

(with bus version 3 and 13 not used)

## 8-pin socket round

Pin	Connection
1	supply 24V +
2	relay 1 - middle contact
3	relay 2 - middle contact
4	relay 1 - opener
5	relay 1 - closer
6	supply GND
7	relay 2 - closer
8	relay 2 - opener

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

Article	Item no.
Round plug 8-pin Binder (solder termination)	918 299
Round plug 8-pin with 5m – cable, on one side prefabricated	787 733
Round plug 8-pin with 10m – cable, on one side prefabricated	787 734
SUB-HD-plug 15-pin with 5m – cable, on one side prefabricated	787 735
SUB-HD-plug 15-pin with 10m – cable, on one side prefabricated	787 736
RS232-adapter – for connection to a PC	654 757
Cable for RS232 9-pin socket/plug 2m	917 039
Adapter RS485	658 499
Configuration software (Mass Flow Communicator)	Info at <a href="http://www.buerkert.com">www.buerkert.com</a>

**Note**

You can fill out the fields directly in the PDF file before printing out the form.

**MFC/MFM applications - request for quotation**

Please fill out and send to your nearest Bürkert facility\* with your inquiry or order

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

MFC-application   
  MFM-application   
  Quantity   
  Required delivery date

**Medium data**

Type of gas (or gas proportion in mixtures)

Density [kg/m<sup>3</sup>] <sup>1)</sup>

Medium temperature [°C or °F]  °C     °F

Moisture content [g/m<sup>3</sup>]

Abrasive components / solid particles   
  no   
  yes as follows

**Fluidic data**

**Maximum flow Q<sub>nom</sub>**   
  l<sub>N</sub>/min<sup>1)</sup>   
  cm<sub>N</sub><sup>3</sup>/min<sup>1)</sup>  
 m<sub>N</sub><sup>3</sup>/h<sup>1)</sup>   
  cm<sub>s</sub><sup>3</sup>/min (sccm)<sup>2)</sup>  
 kg/h   
  l<sub>s</sub>/min (slpm)<sup>2)</sup>

**Minimum flow Q<sub>min</sub>**   
  l<sub>N</sub>/min<sup>1)</sup>   
  cm<sub>N</sub><sup>3</sup>/min<sup>1)</sup>  
 m<sub>N</sub><sup>3</sup>/h<sup>1)</sup>   
  cm<sub>s</sub><sup>3</sup>/min (sccm)<sup>2)</sup>  
 kg/h   
  l<sub>s</sub>/min (slpm)<sup>2)</sup>

**Inlet pressure at Q<sub>nom</sub>**   
  barg or   
  psig <sup>■</sup>

**Outlet pressure at Q<sub>nom</sub>**   
  barg or   
  psig <sup>■</sup>

**Max. inlet pressure p<sub>1max</sub>**   
  barg or   
  psig <sup>■</sup>

**Pipe run (external-Ø)**   
  metric, mm   
  imperial, inch

**MFC/MFM-port connection**  
 without screw-in fitting  
      1/4" thread G-thread (DIN ISO 228/1)  
      1/4" thread NPT-thread (ANSI >B1.2)  
 with screw-in fitting

**Ambient temperature**   
  °C

**Material data**

**Body material**   
  Stainless steel

**Sealing material**   
  FKM   
  EPDM   
  Other

**Electrical Data**

**Output signal**  
 0-20 mA   
  4-20 mA  
 0-10 V   
  0-5 V  
 Profibus-DP   
  DeviceNet

■ Please quote all pressure values as overpressure with respect to atmospheric pressure [barg]

<sup>1)</sup> at: 1.013 bar (a) and 0°C    <sup>2)</sup> at: 1.013 bar (a) and 20°C

To find your nearest Bürkert facility, click on the orange box → [www.burkert.com](http://www.burkert.com)

In case of special application conditions, please consult for advice.    We reserve the right to make technical changes without notice.    0704/2\_EU-en\_00891856

DTS 1000011286 EN Version: D Status: RL (released | freigegeben | validé) printed: 16.07.2008