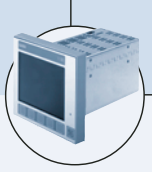


Mass Flow Meter (MFM) for gases



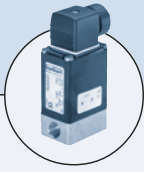
- Inline MFM for nominal flow rates from 25 I_N/min to 1,500 I_N/min; 1/4" to 3/4"
- High accuracy
- Fast settling time
- Fieldbus option
- Special version for ammonia gas

Type 8006 can be combined with...



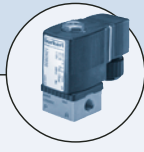
Type 1150

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 8006 uses an inline sensor based on the thermal principle (see the description on page 2) located directly in the main channel. Due to the fact that the sensor is directly in the main channel a very fast response time of the MFM is reached. Another benefit of this main stream measurement is that it is less sensitive to contamination. The actual flow is given as an analog

output signal or could be read out over Fieldbus communication. Type 8006 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 measurements in:

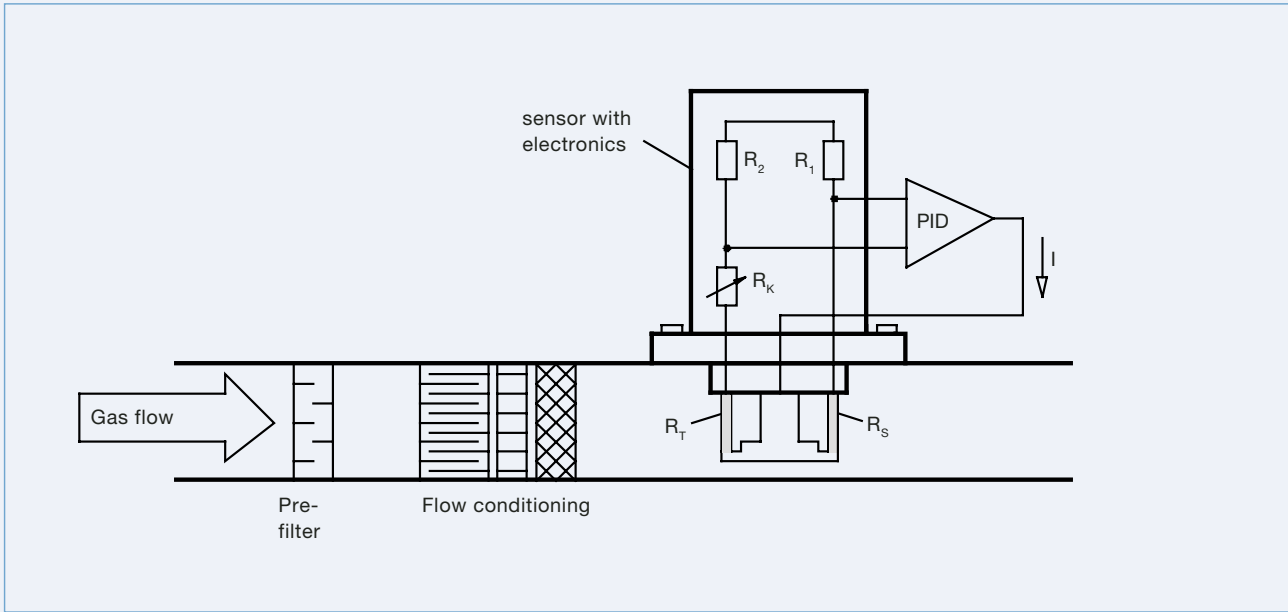
- Heat treating processes
- Test benches
- Packaging and foodstuff industry
- Environmental technology
- Medical technology, and
- Analysis technology

Technical data

Full scale ranges ¹⁾ (Q _{nom})	25 to 1,500 I _N /min Reference medium N ₂	Voltage tolerance	±10%
Operating media	neutral, non-contaminated gases, others on request	Residual ripple	<5%
Max. operating pressure	up to max. 10 bar	Power consumption	max. 10W max. 12.5 W (Bus version)
Max. pressure drop	120 mbar	Output signal (actual value output)	0–5 V, 0–10 V, 0–20 mA or 4–20 mA
Calibration medium	Operating gas or air with conversion factor	Max. current, volt. output	10 mA
Medium temperature	-10 to +70°C	Max. load, current output	600 Ω
Ambient temperature	-10 to +45°C	Fieldbus communication	Profibus-DP, DeviceNet, others on request
Accuracy (after 15 min. warm up time)	±1.5% of rate ±0.3% F.S.	Protection class	IP65
Linearity	±0.25% F.S.	Dimensions [mm]	see drawing on p. 3
Repeatability	±0.1% F.S.	Total weight (Examples for standard blocks)	1.2 kg (Al) 3.0 kg (VA)
Control range	1:50	Mounting position	horizontal or vertical
Response time (t_{95%})	<500 ms	Light emitting diodes (Default, other allocations possible)	Indication for power, communication, limit, error
Body material	Stainless steel 1.4305 or aluminium (anodised)	Binary input (Default, other functions possible)	three, different functions possible – with default not assigned
Electronics housing material	Aluminium (coated)	Binary output (Default, other functions possible)	two relay outputs for 1. limit (Q _{nom} almost reached) 2. error (e.g. sensor fault) max. load 30VDC, 1A/30VAC, 0,5A
Sealing material	FKM, EPDM (others on request)	Certification (see operating instructions)	various environmental tests, electromagnetic compatibility
Port connection	G 1/4, 3/8, 1/2, 3/4, NPT 1/4, 3/8, 1/2, 3/4		
Electr. connection			
Round socket	8-pin		
Sub-HD socket	15-pin		
Fieldbus comm.	9-pin sub-D socket		
Power supply	24V DC		

¹⁾ At reference conditions 1.013 bar(a) and 0°C

Functional principle of the registration of the measured values



This sensor works as a hot-film anemometer in the so-called CTA operational mode (Constant Temperature Anemometer). To do this, two resistors with precisely specified temperature coefficients are located directly in the media flow and three resistors are located outside the flow are connected together to form a bridge.

The first resistor in the medium flow (R_T) measures the fluid temperature, the second, low-value resistor (R_S) is heated so that it is maintained at a fixed, predefined over-temperature

with respect to the fluid temperature. The heating current required to maintain this is a measure of the heat being removed by the flowing gas, and represents the primary measurement.

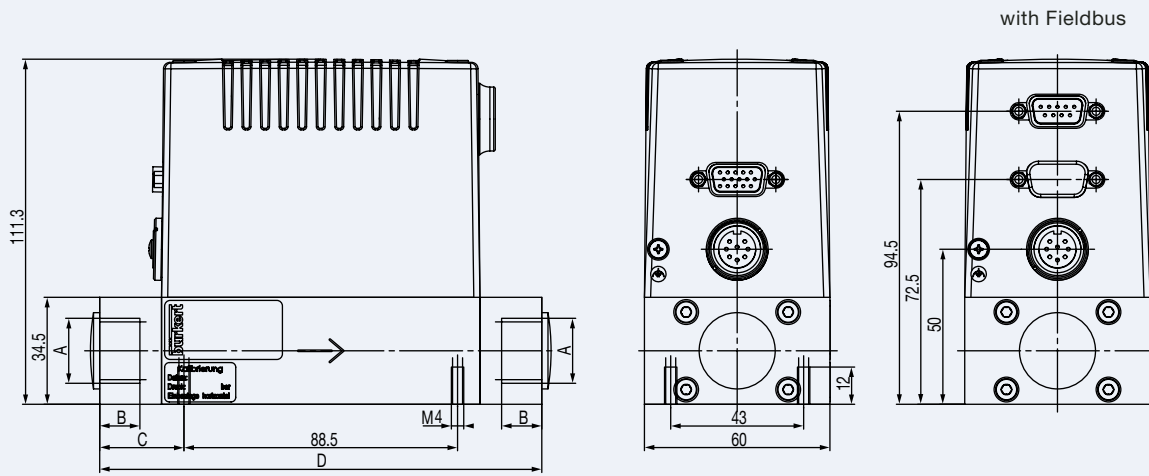
An adequate flow conditioning within the MFM and the calibration with high-quality flow standards ensure that the mass of gas flowing per time unit can be derived from the primary signal with great accuracy.

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.

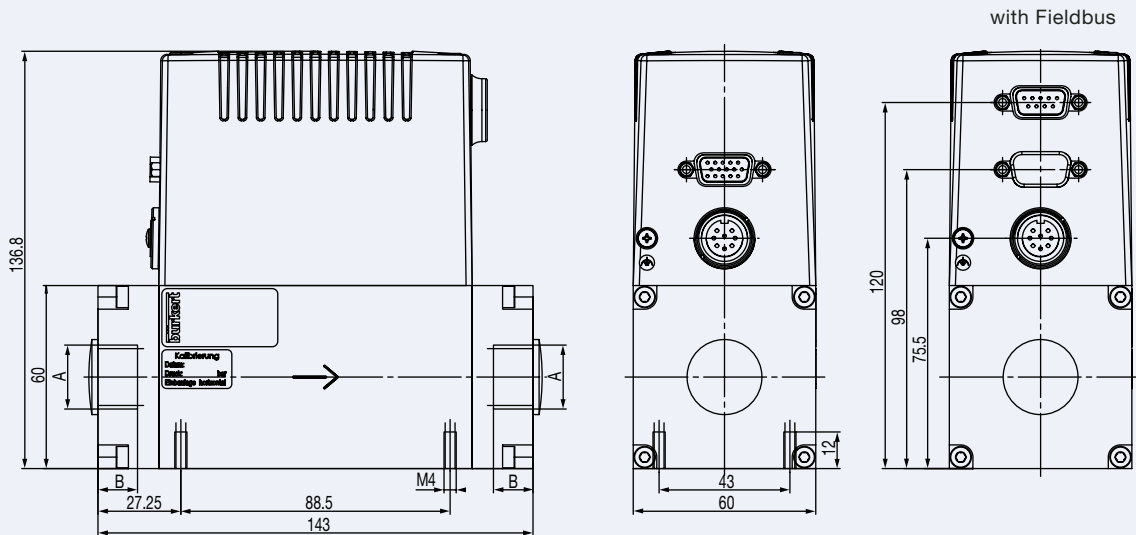
▶ **The questionnaire on page 6 contains the relevant fluid specification. Please use in this way the experience of Burkert engineers already in the design phase and provide us with a copy of the questionnaire containing the data of your application together with your inquiry or order.**

Dimensions [mm]

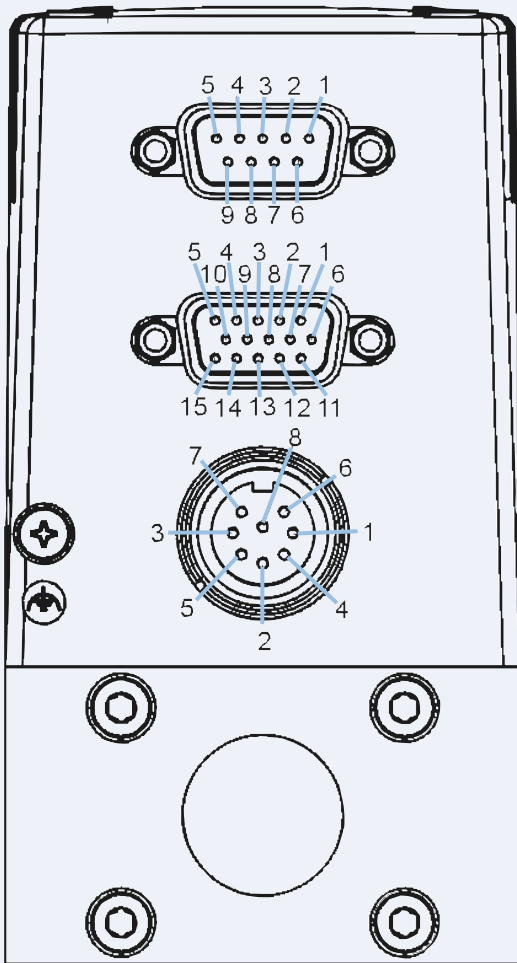


A	B	C	D
G 3/4; NPT 3/4	14	27.25	143
G 1/2; NPT 1/2	13	27.25	143
G 3/8; NPT 3/8	10	22.25	133
G 1/4; NPT 1/4	10	22.25	133

MFM 8006 for high flow rates



A	B
G 3/4; NPT 3/4	15
G 1/2; NPT 1/2	13



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 RxD (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 www.buerkert.com

Specification sheet for MFC/MFM applications

▶ Please fill in and send to your local Burkert Sales Centre via e-mail, fax or regular post together 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	<input type="checkbox"/> without screw-in fitting <input type="checkbox"/> G-thread (DIN ISO 228/1) <input type="checkbox"/> NPT-thread (ANSI B1.2) <input type="checkbox"/> with screw-in fitting		
Ambient temperature	<input type="text"/> °C		
Material data			
Body material	<input type="checkbox"/> Stainless steel		
Sealing materia	<input type="checkbox"/> FKM	<input type="checkbox"/> EPD	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: 1.013 bar(a) and 0°C

²⁾ at: 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
Postcode/Town/Country	E-mail

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

We reserve the right to make technical changes without notice.

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