

# Mass Flow Meter (MFM) for gases

Inline meter for nominal flow rates from 25 to 1500 l<sub>N</sub>/min; 1/4" to 3/4"

## Type 8006

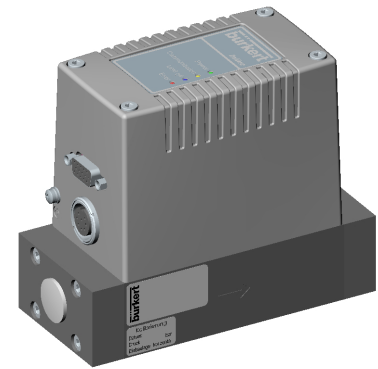
### PRODUCT INFORMATION

### TECHNICAL DATA

<b>Full scale ranges</b> <sup>1)</sup> (Q <sub>neff</sub> )	25 to 1500 l <sub>N</sub> /min N <sub>2</sub> equivalent	<b>Power supply</b>	24 V DC
<b>Operating media</b>	neutral, non-contaminated gases, other gases on request	<b>Voltage tolerance</b>	±10 %
<b>Max. operat. press.</b>	max. 10 barg	<b>Residual ripple</b>	< 5 %
<b>Max. pressure drop</b>	120 mbar	<b>Power consumption</b>	max. 10 W max. 12,5 W (bus-version)
<b>Calibration medium</b>	operating gas or air with conversion factor	<b>Output signal</b>	0-5 V, 0-10 V, 0-20 mA or 4-20mA
<b>Medium temperature</b>	-10 to +70 °C	<b>Max. current, volt. output</b>	10 mA
<b>Ambient temp.</b>	-10 to +45 °C	<b>Max. load, current output</b>	600 Ω
<b>Accuracy</b> (after 15min. warm up time)	±1,5% of rate ±0,5% F.S.	<b>Fieldbus communication</b>	Profibus-DP, DeviceNet, others on request
<b>Linearity</b>	±1% F.S.	<b>Protection class</b>	IP 65
<b>Repeatability</b>	±0,5% F.S.	<b>Dimensions [mm]</b>	see drawings p. 2
<b>Control range</b>	1:50	<b>Total weight</b> (examples)	1,2 kg (Al, 1/4" bis 1/2") 3,0 kg (VA, 1/4" bis 1/2")
<b>Settling time (t<sub>95%</sub>)</b>	< 500 ms	<b>Mounting position</b>	horizontal or vertical
<b>Body material</b>	anodised aluminium or stainless steel 1.4305	<b>Light emitting diodes</b>	indication for Power, Communication, Limit, Error
<b>Electr. housing material</b>	aluminium (coated)	<b>Binary input</b>	three
<b>Sealing material</b>	FPM, EPDM others on request	<b>Binary output</b>	two relay-outputs for
<b>Port connection</b>	G 1/4, 3/8, 1/2, 3/4, NPT 1/4, 3/8, 1/2, 3/4	<b>Certification</b>	(see operating instructions)
<b>Electr. connection</b>	round socket 8-pin sub-HD socket 15-pin Fieldbus comm. 9-pin sub-D socket		

**Pressure data [barg]** overpressure with respect to atmospheric pressure

<sup>1)</sup> at reference conditions 1,013bar(a), 0°C



### SHORT DESCRIPTION

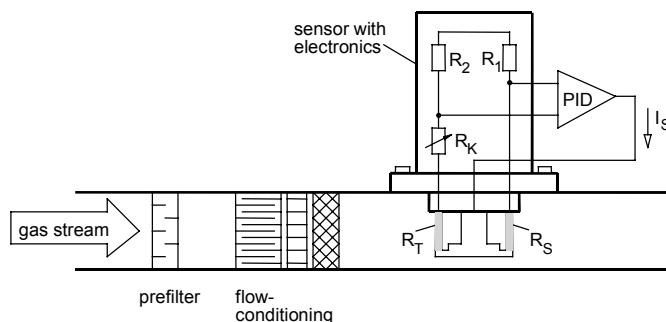
Burkert's compact 8006 Mass Flow Meter precisely measures gas flows independently of disturbances such as pressure variation.

The flow sensor utilises the hot-film anemometer principle. As mass flow changes the filament current adapts to hold a constant temperature. The current required to keep the filament temperature constant is proportional to the actual mass flow through the apparatus. (see description alongside) The 8006 exhibits excellent dynamics as it measures gas flows in the main stream. It is because of this main stream measurement that the sensor location of the system is also less sensitive to contamination. Processing of the flow data is carried out by digital microprocessor electronics. Signals from the sensor are converted, with the aid of a calibration curve stored in the EEPROM, into an exact and instantaneous mass flow rate.

Typical application areas are gas metering in

- process technology,
- environmental technology,
- surface refinement,
- material coating and
- fuel cell technology.

### Functional principle of the registration of the measured values



This sensor utilises the hot-film-anemometer principle in the so called Constant Temperature Anemometer mode. There are two resistances with precisely specified temperature coefficients directly in the gas stream as well as three resistances outside the gas stream interconnected to a bridge.

The first resistance (RT) in the gas stream measures the temperature of the medium, the second resistance (RS) with low impedance is so far heated that it is held on a fix given over-temperature to the medium temperature. The filament current which is necessary for that is a measure for the heat dissipation by the flowing gas and represents the primary measured variable.

The calibration with a high-quality flow-normal guarantees as well as an adequate flow conditioning within the MFC that from the primary signal the mass of gas, flowing through per time unit, can be derived with a high accuracy.

**burkert**  
Fluid Control Systems

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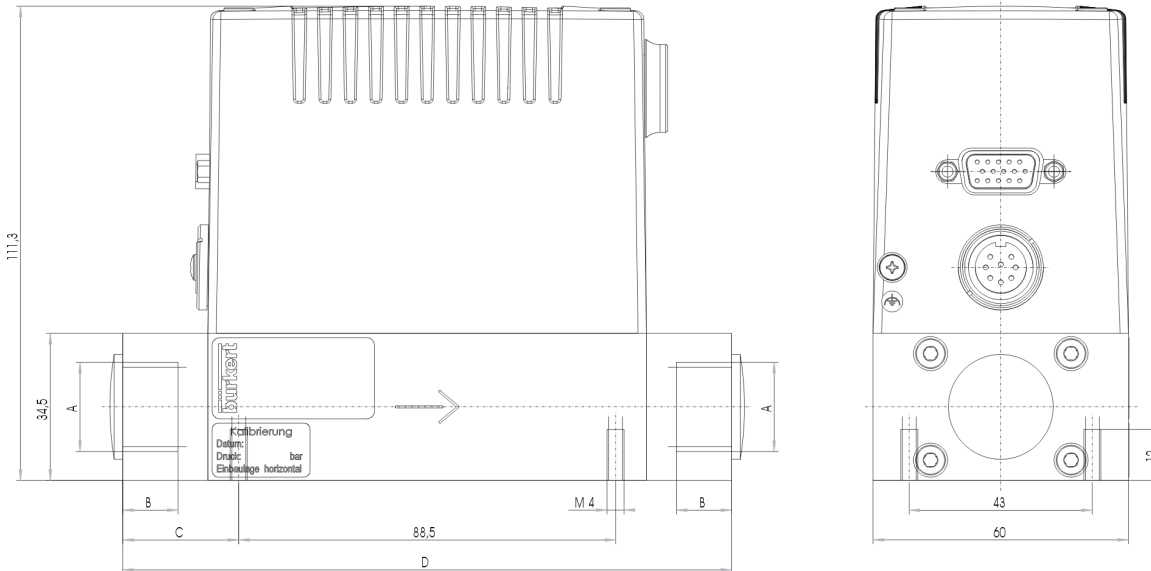
Inline meter for nominal flow rates from 25 to 1500 l<sub>N</sub>/min; 1/4" to 3/4"

## 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 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.

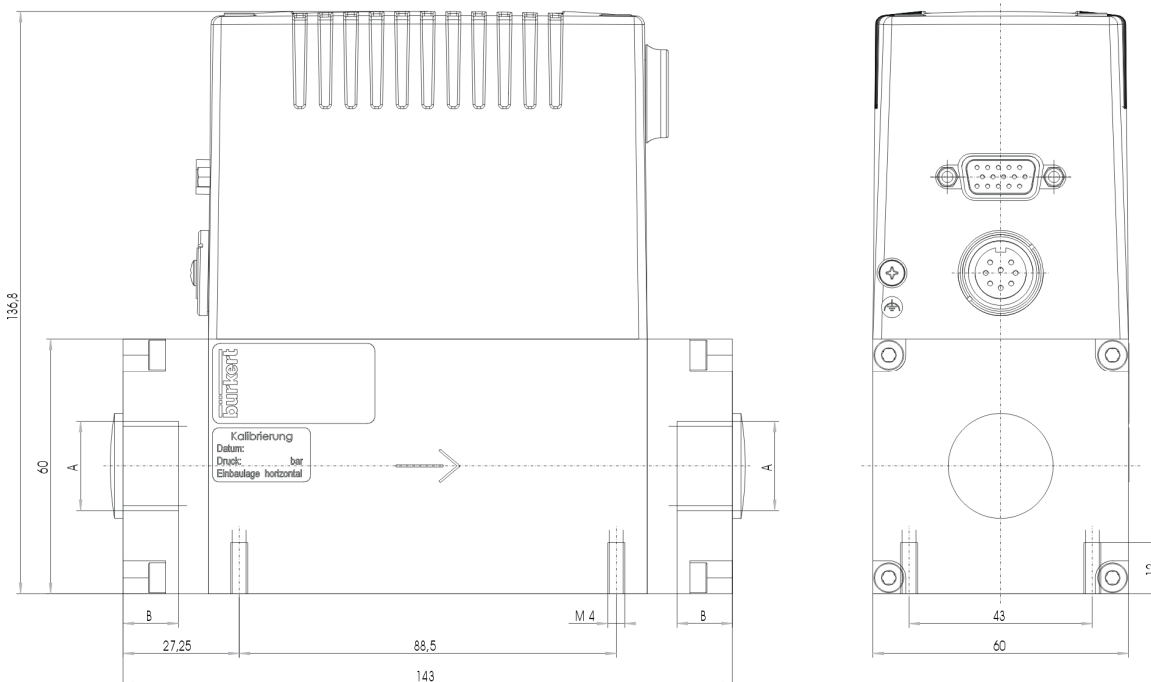
The attached questionnaire on page 4 contains the relevant fluid specification. Please use in this way the authority of Burkert engineers already in the planning phase and provide us a filled out copy of the questionnaire with your inquiry or order!

## ABMESSUNGEN [mm]

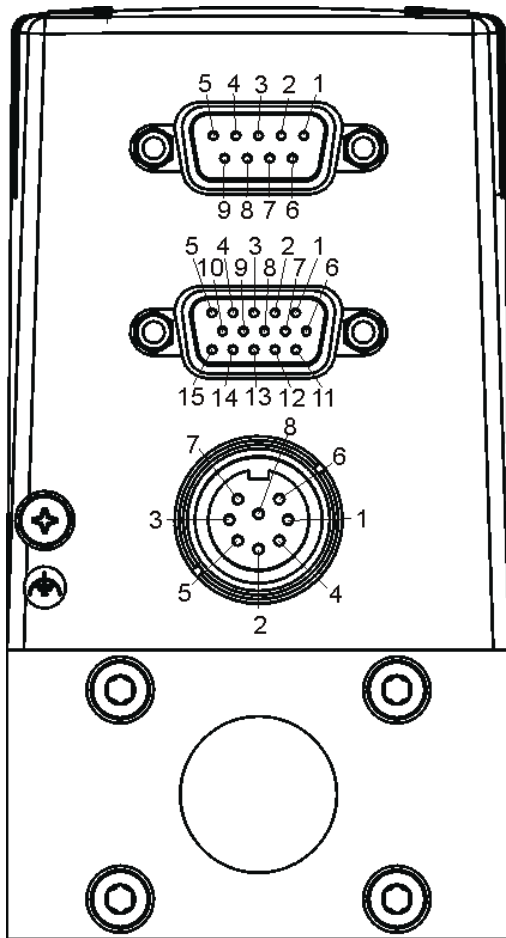


G 3/4; NPT 3/4	14	27,25	143
G 1/2; NPT 1/2	13		
G 3/8; NPT 3/8	10	22,25	133
G 1/4; NPT 1/4			
A	B	C	D

## ABMESSUNGEN [mm] (für große Durchflüsse)



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



### 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	Ordering-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

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## 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 <sup>3</sup>	
Medium temperature	<input type="checkbox"/> °C or <input type="checkbox"/> °F	
Moisture content	g/ m <sup>3</sup>	
Abrasive components / solid particles	<input type="checkbox"/> no <input type="checkbox"/> yes, as follows:	
FLUIDIC DATA		
Maximum flow Q <sub>nom</sub>	<input type="checkbox"/> l <sub>N</sub> /min <input type="checkbox"/> m <sub>N</sub> <sup>3</sup> /h <input type="checkbox"/> kg/h	<input type="checkbox"/> cm <sub>N</sub> <sup>3</sup> /min <input type="checkbox"/> cm <sub>S</sub> <sup>3</sup> /min (sccm) <input type="checkbox"/> l <sub>S</sub> /min (slpm)
Minimum flow Q <sub>min</sub>	<input type="checkbox"/> l <sub>N</sub> /min <input type="checkbox"/> m <sub>N</sub> <sup>3</sup> /h <input type="checkbox"/> kg/h	<input type="checkbox"/> cm <sub>N</sub> <sup>3</sup> /min <input type="checkbox"/> cm <sub>S</sub> <sup>3</sup> /min (sccm) <input type="checkbox"/> l <sub>S</sub> /min (slpm)
Inlet pressure at Q <sub>nom</sub>	p <sub>1</sub> = _____ <input type="checkbox"/> barg or <input type="checkbox"/> psig ■	
Outlet pressure at Q <sub>nom</sub>	p <sub>2</sub> = _____ <input type="checkbox"/> barg or <input type="checkbox"/> psig ■	
Max. inlet pressure p <sub>1max</sub>	_____ <input type="checkbox"/> barg or <input type="checkbox"/> psig ■	
Pipe run (external-Ø)	<input type="checkbox"/> metric, _____ mm <input type="checkbox"/> imperial, _____ inch	
MFC-/MFM-port connection (1/4"-3/4"-internal thread or screw-in fitting)	<input type="checkbox"/> without screw-in fitting, _____ inch <input type="checkbox"/> G-thread (DIN ISO 228/1) <input type="checkbox"/> NPT-thread (ANSI B1.2) <input type="checkbox"/> with screw-in fitting	
Mounting position of the MFC/MFM	<input type="checkbox"/> horizontal, valve on top (standard) <input type="checkbox"/> horizontal, valve on side <input type="checkbox"/> vertical, flow upwards <input type="checkbox"/> vertical, flow downwards	
Ambient temperature	_____ °C	
MATERIAL DATA		
Body material	<input type="checkbox"/> Aluminium (anodized) <input type="checkbox"/> Stainless steel	
Sealing material	<input type="checkbox"/> FPM (Viton) <input type="checkbox"/> EPDM <input type="checkbox"/> other:	
ELECTRICAL DATA		
Output / input signal	<input type="checkbox"/> 0-20mA / 0-20mA <input type="checkbox"/> 4-20mA / 4-20mA <input type="checkbox"/> 0-10V / 0-10V <input type="checkbox"/> 0-5V / 0-5V	
Fieldbus communication	<input type="checkbox"/> Profibus-DP <input type="checkbox"/> DeviceNet	

■ 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