Mass Flow Meter (MFM) for gases

Inline meter for nominal flow rates from 25 to 1500 l_N/min; 1/4" to 3/4"

Type 8706

PRODUCTINFORMATION

TECHNICAL DATA

Full scale ranges [1]	25 to 1500 l_N/min	**Power supply**	24 V DC
(Q_{nenn})	N_2 equivalent	**Voltage tolerance**	±10 %
Operating media	neutral, non-conta-	**Residual ripple**	< 5 %
	minated gases, other	**Power consumption**	max. 10 W
	gases on request		max. 12,5 W (bus-version)
Max. operat. press.	max. 10 barg	**Output signal**	0-5 V, 0-10 V, 0-20 mA
Max. pressure drop	120 mbar		or 4-20mA
Calibration medium	operating gas or air	Max. current, volt. output	10 mA
	with conversion factor	Max. load, current output	600 Ω
Medium temperature	-10 to +70 °C	**Fieldbus**	Profibus-DP, DeviceNet,
		communication	others on request
Ambient temp.	-10 to +45 °C	**Protection class**	IP 65
Accuracy	±1,5% of rate ±0,5% F.S.	**Dimensions [mm]**	see drawings p. 2
(after 15min. warm up time)		**Total weight**	1,2 kg (Al, ¼" bis ½")
Linearity	±1% F.S.	(examples)	3,0 kg (VA, ¼" bis ½")
Repeatability	±0,5% F.S.	**Mounting position**	horizontal or vertical
Control range	1:50	**Light emitting diodes**	indication for
Settling time ($t_{95\%}$)	< 500 ms	(Default, other allocations	Power, Communication,
Body material	anodised aluminium or	possible)	Limit, Error
	stainless steal 1.4305		
Electr. housing	aluminium (coated)	**Binary input**	three
material		(Default, other functions	1. not assigned
Sealing material	FPM, EPDM	possible)	2. not assigned
	others on request		3. not assigned
Port connection	G 1/4, 3/8, 1/2, 3/4,	**Binary output**	two relay-outputs for
	NPT 1/4, 3/8, 1/2, 3/4	(Default, other functions	1. Limit (Q_{nom} almost
Electr. connection		possible)	reached)
round socket	8-pin		2. error (e.g. sensor fault)
sub-HD socket	15-pin		max. load: 60V, 1A, 60VA
Fieldbus comm.	9-pin sub-D socket	**Certification**	various environmental
		(see operating instructions)	testing, electromagnetic
			compatibility

[1] bei Normbedingungen 1013 mbar(a) und 273 K

SHORT DESCRIPTION

Burkert's compact 8706 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 though the apparatus. (see description along-side)

The 8706 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 a exact and instaneous mass flow rate.

Type 8706 can optionally be calibrated for two different gases, the user is able to switch between these two gases.

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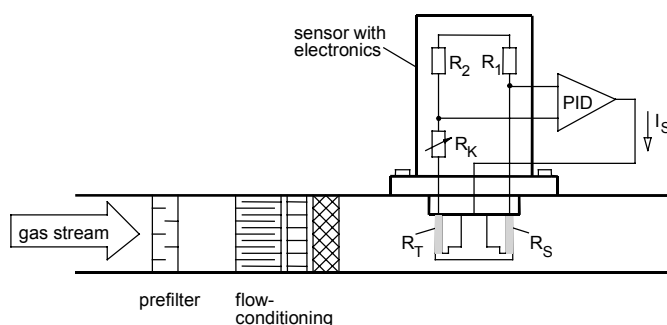
This sensor utilises the hot-film-anemometer principle in the so called Constant Temperature Anemometer mode. There are two resistances with precisely specified temperature coefficients directly in the gas stream as well as three resistances outside the gas stream interconnected to a bridge.

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.

bürkert
Fluid Control Systems

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 5 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!
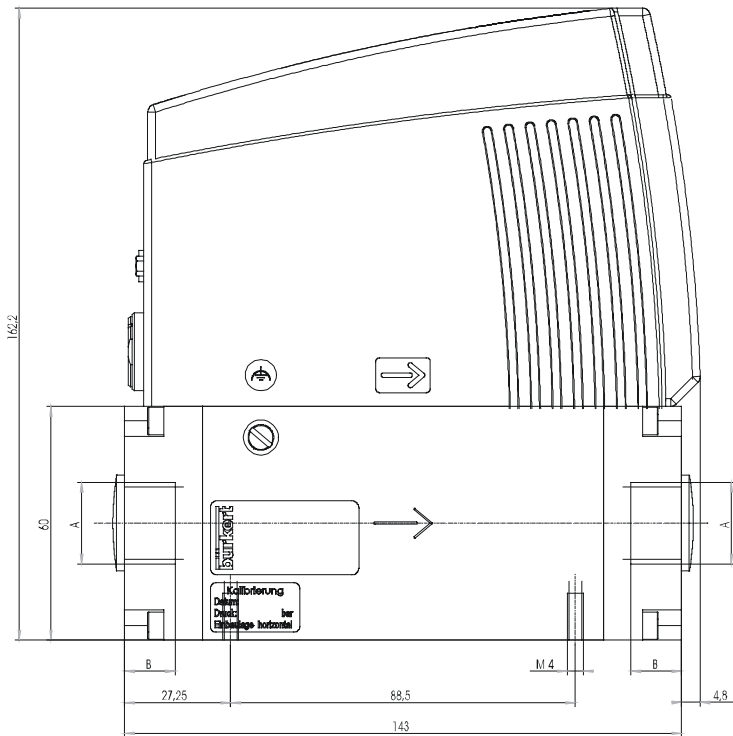
ABMESSUNGEN [mm]
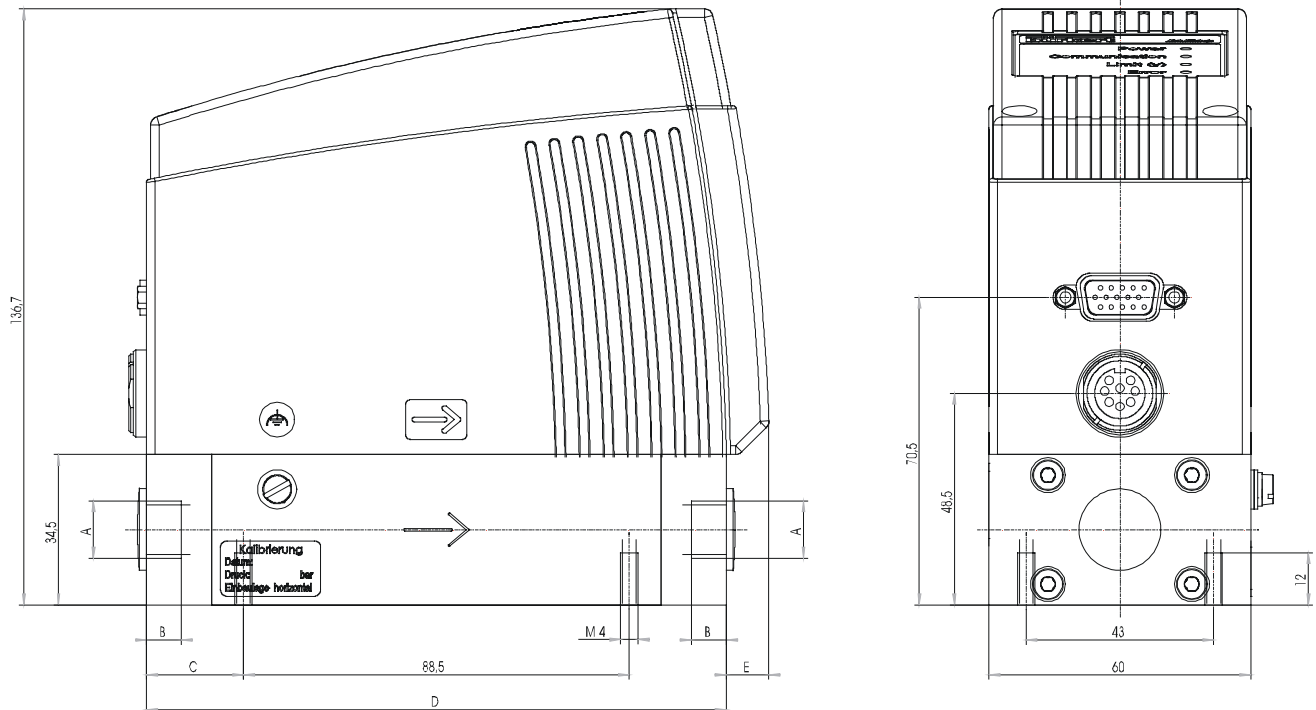
G 1/2 NPT 1/2	13	27,25	143	4,8
G 3/8 NPT 3/8	10	22,25	133	9,8
G 1/4 NPT 1/4	10	22,25	133	9,8
A	B	C	D	E

High flow rates:
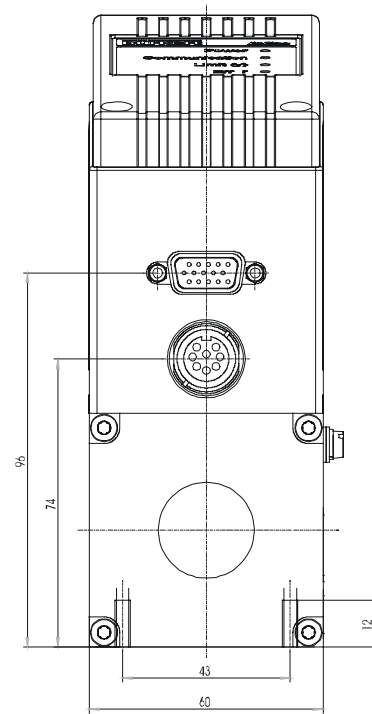
G 3/4 NPT 3/4	15
G 1/2 NPT 1/2	13
A	B

Bus-version:
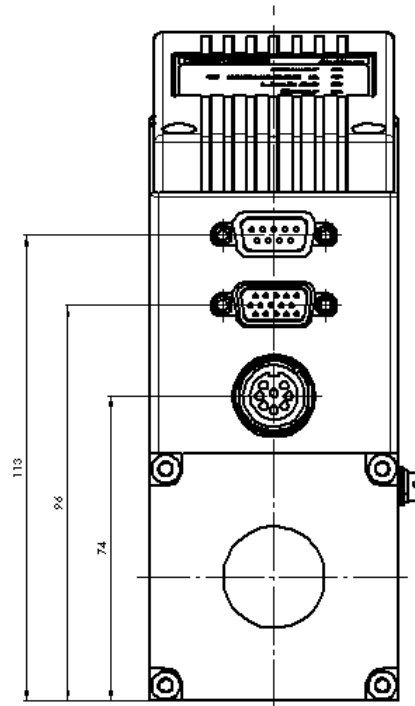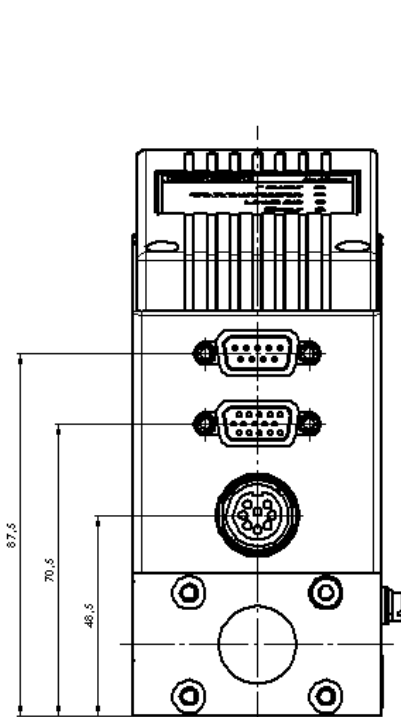
9-pin SUB-D socket

Profibus-DP

1	shield
2	N.C.
3	RxD/TxD – P (B-line)
4	RTS (control signal for repeater)
5	GND
6	VDD
7	N.C.
8	RxD/TxD – N (A-line)
9	N.C.

DeviceNet

1	shield
2	CAN_L
3	GND
4	N.C.
5	N.C.
6	N.C.
7	CAN_H
8	N.C.
9	N.C.

15-pin SUB-HD socket

1	N.C.
2	N.C.
3	signal output + (N.C. with Fieldbus)
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 (N.C. with Fieldbus)
14	RS232 RxD (direct connection to PC)
15	DGND (for RS232)

8-pin socket round

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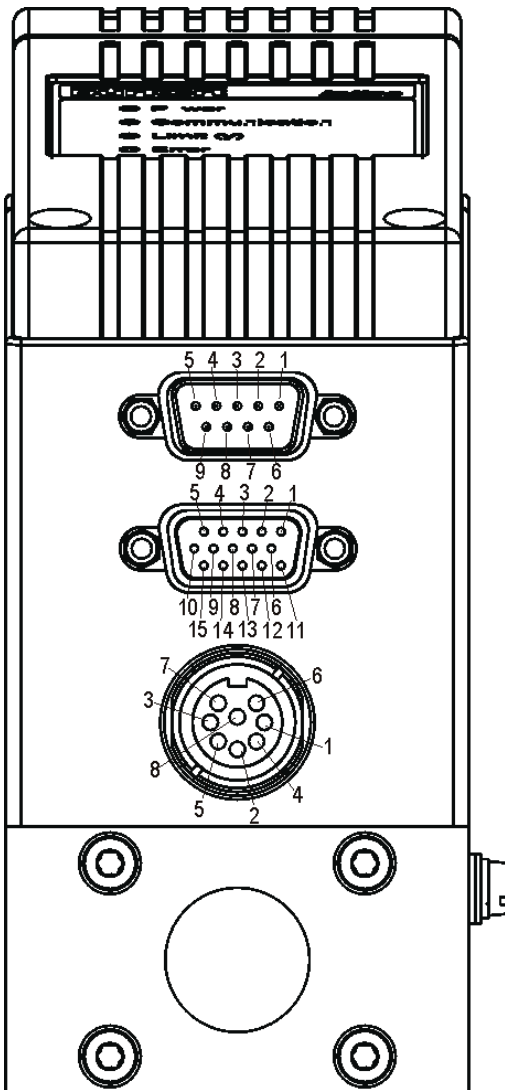
Ordering table for accessories (connectors are not included in the delivery)

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

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_s^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}	p_1 = _____ ☐ barg or ☐ psig ■	
Outlet pressure at Q_{nom}	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	
Fieldbus communication	☐ **Profibus-DP** ☐ **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