Mass Flow Controller (MFC) for gases

Type 8626

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

PRODUCTINFORMATION

TECHNICAL DATA

Full scale ranges [1]	25 to 1500 l_N/min	**Power supply**	24 V DC
(Q_{nom})	N_2 equivalent	**Voltage tolerance**	±10 %
Operating media	neutral, non-conta-minated gases, other gases on request	**Residual ripple**	< 5 %
		Power consumption	20 W – max. 50 W (depending on specification)
Max. operat. press.	max. 10 barg, depending on the orifice of the valve	**Set point**	0-5 V, 0-10 V, 0-20 mA or 4-20mA
Calibration medium	operating gas or air with conversion factor	Feed impedance	> 20 kΩ (voltage) < 300 Ω (current)
Medium temperature	-10 to +70 °C	**Output signal**	0-5 V, 0-10 V, 0-20 mA or 4-20mA
Ambient temp.	-10 to +45 °C		
Accuracy (after 15min. warm up time)	±1,5% of rate ±0,5% F.S.	Max. current, voltage output	10 mA
		Max. load, current output	600 Ω
Linearity	±1% F.S.	**Fieldbus communication**	Profibus-DP, DeviceNet, others on request
Repeatability	±0,5% F.S.	**Protection class**	IP 65
Control range	1:50	**Dimensions [mm]**	see drawings p. 2-4
Settling time ($t_{95\%}$)	< 500 ms	**Total weight** (examples)	1,8 kg (Al, 10 W valve)
Body material	anodised aluminium or stainless steal 1.4305		4,0 kg (VA, 14 W valve)
Electr. housing material	aluminium (coated)	**Mounting position**	horizontal or vertical
		Light emitting diodes (Default, other allocations possible)	indication for Power, Communication, Limit, Error
Sealing material	FPM, EPDM others on request		
Port connection	G 1/4, 3/8, 1/2, 3/4, NPT 1/4, 3/8, 1/2, 3/4	**Binary input** (Default, other functions possible)	three 1. start autotune 2. not assigned 3. not assigned
Control valve (proportional valve)	normally closed, N.C.		
valve orifice	0,8 bis 12 mm	**Binary output** (Default, other functions possible)	two relay-outputs for 1. set point not reached 2. error (e.g. sensor fault) max. load: 60V, 1A, 60VA
k_{Vs}-value	0,02 bis 2,8 m^3/h		
Electr. connection			
round socket	8-pin	**Certification** (see operating instructions)	various environmental testing, electromagnetic compatibility
sub-HD socket	15-pin		
Fieldbus comm.	9-pin sub-D socket		

[1] at reference conditions 1,013bar(a), 0°C

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 (R_T) in the gas stream measures the temperature of the medium, the second resistance (R_S) 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.

SHORT DESCRIPTION

Bürkert's compact 8626 Mass Flow Controller precisely controls gas flows independently of disturbances such as pressure variation.

The MFC fuses three distinct components: flow sensor, intelligent control electronics and a precision control valve.

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 alongside)

The 8626 exhibits excellent dynamics as it measures gas flows in the main stream. It is because of this mainstream measurement that the sensor portion 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.

The MFC's microprocessor contains elements of proportional and integral (P,I) control algorithms. Using the autotune function allows the user to achieve optimal control and extremely high accuracy.
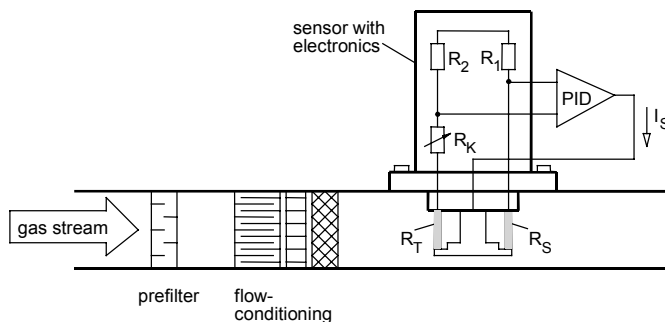
Tight shut off is assured as a function of the control valve eliminating the normal requirement for additional on-off valves.

Bürkert's modular concept allows timely construction of tailor-made mass flow solutions.

Typical application areas are gas metering or rather the production of gas mixtures in

- process technology,
- packaging and foodstuff industry,
- environmental technology,
- surface refinement,
- material coating,
- burner controllers and
- fuel cell technology.

bürkert
Fluid Control Systems

Notes regarding the selection of the unit

For the proper choice of the actuator orifice within the MFC, not only the required maximum flow rate Q_{nom} , but also the pressure values *directly* before and after the MFC (p_1, p_2) at this flow rate Q_{nom} should be known.

In general, these pressures are not the same as the overall inlet and outlet pressures of the whole plant, because usually there are additional flow resistors (tubing, additional shut-off valves, nozzles etc.) present both before and after the controller.

Please use the specification sheet (p. 6) to indicate the pressures *directly* before and after the MFC. If these should be unknown or not accessible to a measurement, estimates are to be made by taking into account the approximate pressure drops over the flow resistors before and after the MFC, respectively, at a flow rate of Q_{nom}.

In addition, please quote the maximum inlet pressure p_{1max} to be encountered. This data is needed to make sure the actuator is able to provide a close-tight function within all the specified modes of operation.

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.
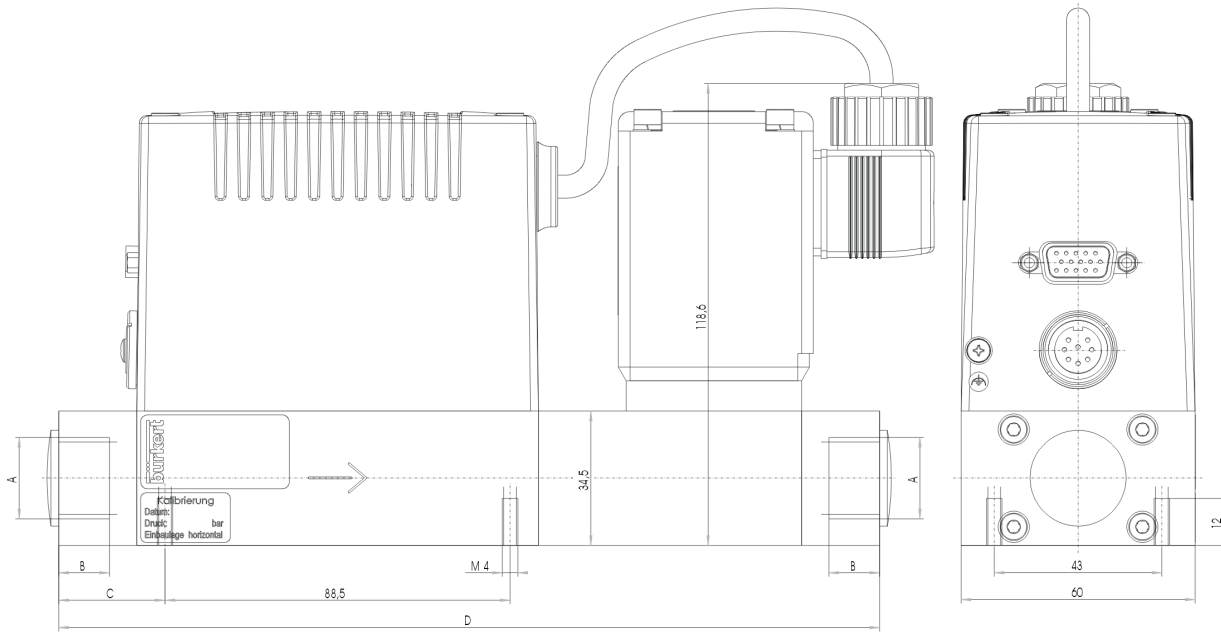
Dimensions [mm]
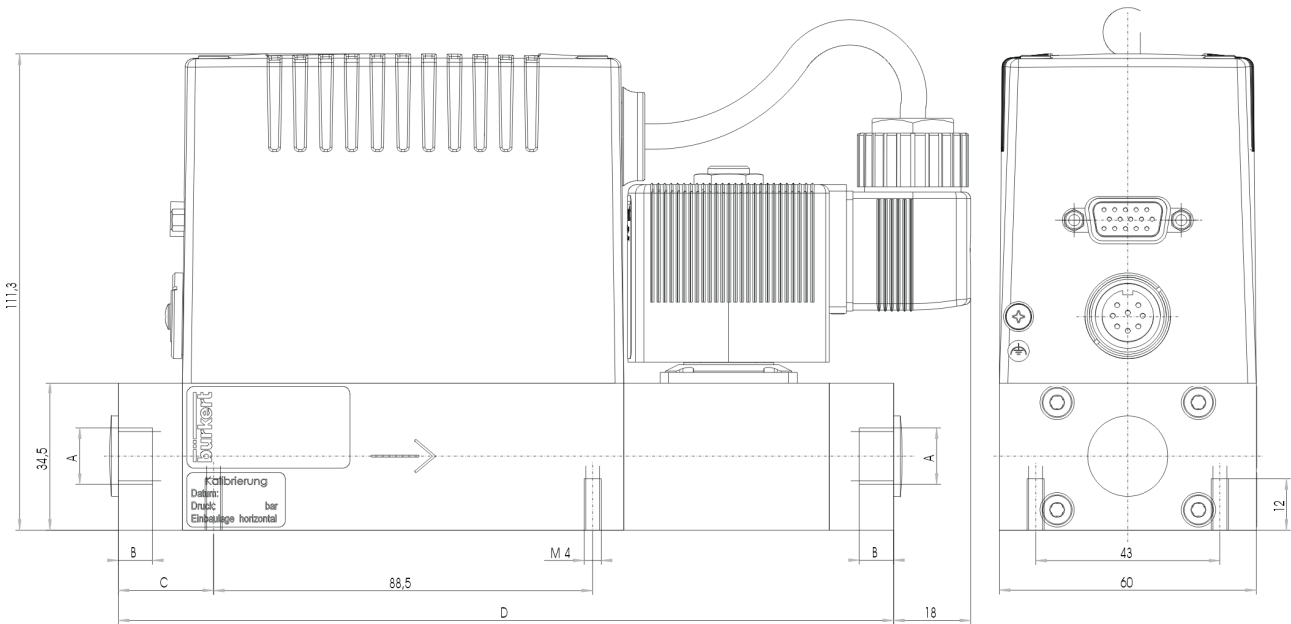
G 3/4; NPT 3/4	14	27,25	191
G 1/2; NPT 1/2	13		
G 3/8; NPT 3/8	10	22,25	181
G 1/4; NPT 1/4			
A	B	C	D

MFC 8626 valve type 6022 (10W coil)

A	B	C	D
G 3/4; NPT 3/4 — 14		27,25	210,5
G 1/2; NPT 1/2 — 13			
G 3/8; NPT 3/8 — 10		22,25	200,5
G 1/4; NPT 1/4			

MFC 8626 with valve type 2834 (14W coil)

A	B
G 3/4; NPT 3/4	14
G 1/2; NPT 1/2	13
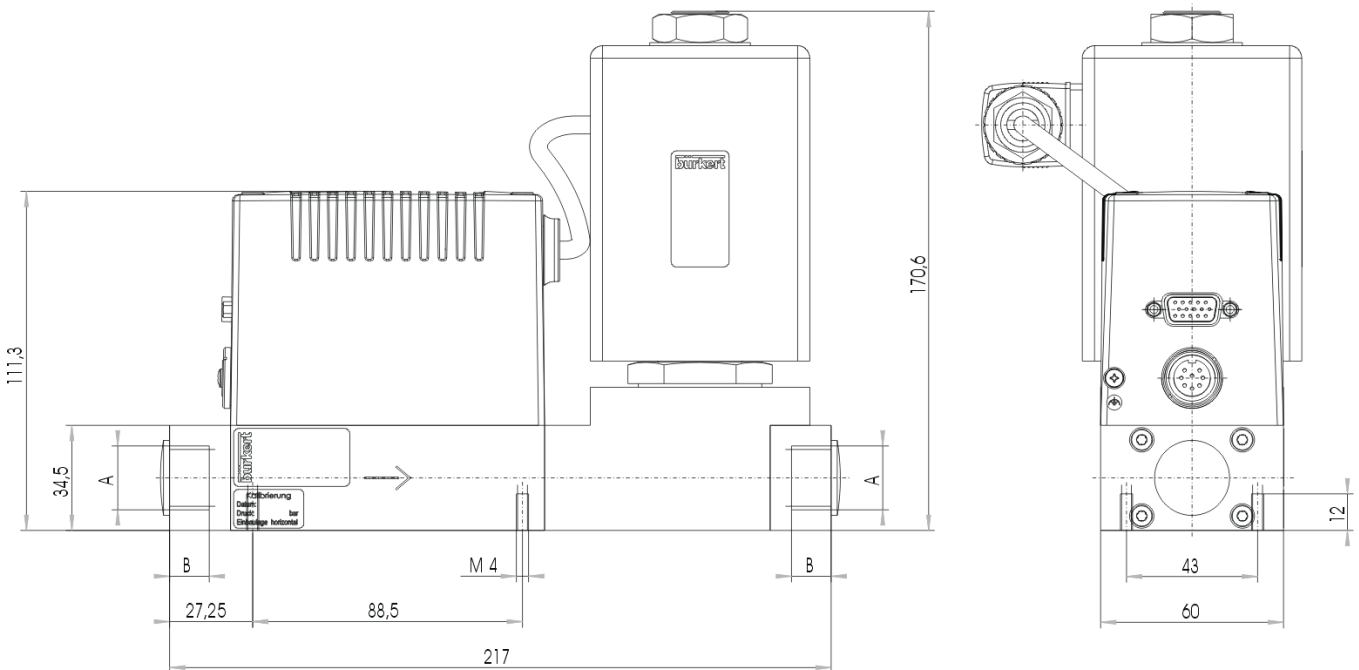
MFC 8626 with valve type 2836 (24W coil)
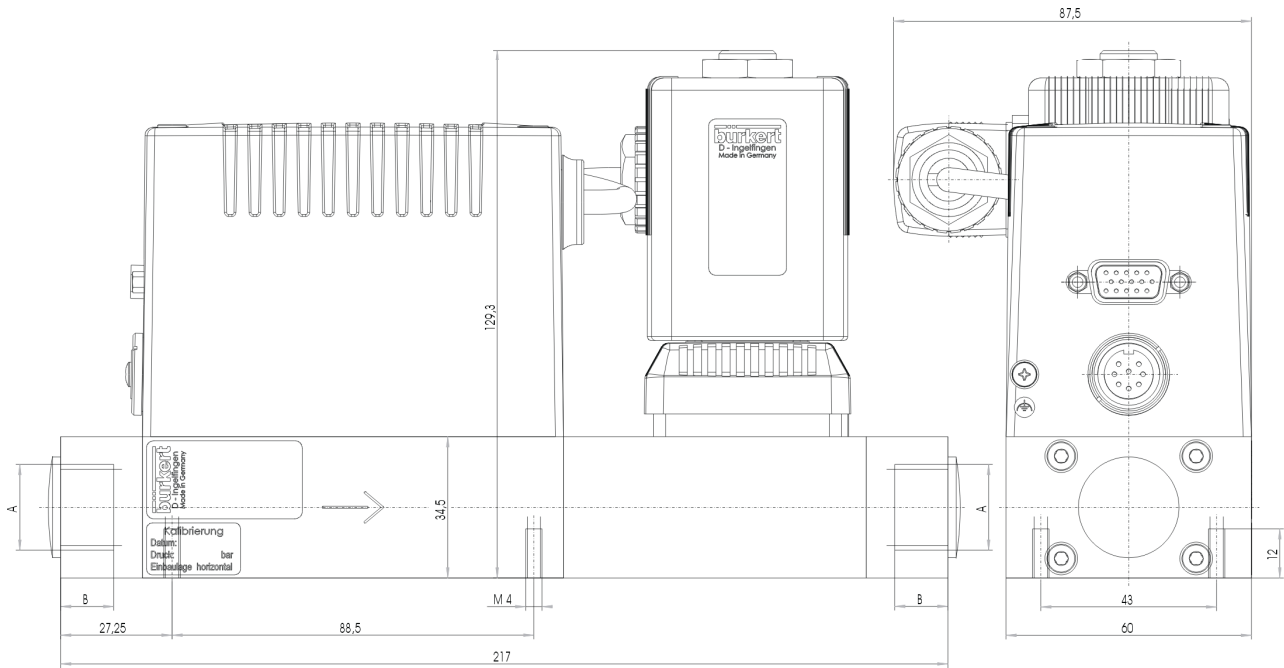
G 3/4; NPT 3/4	14
G 1/2; NPT 1/2	13
A	B

MFC 8626 with valve type 6024 (18W coil)
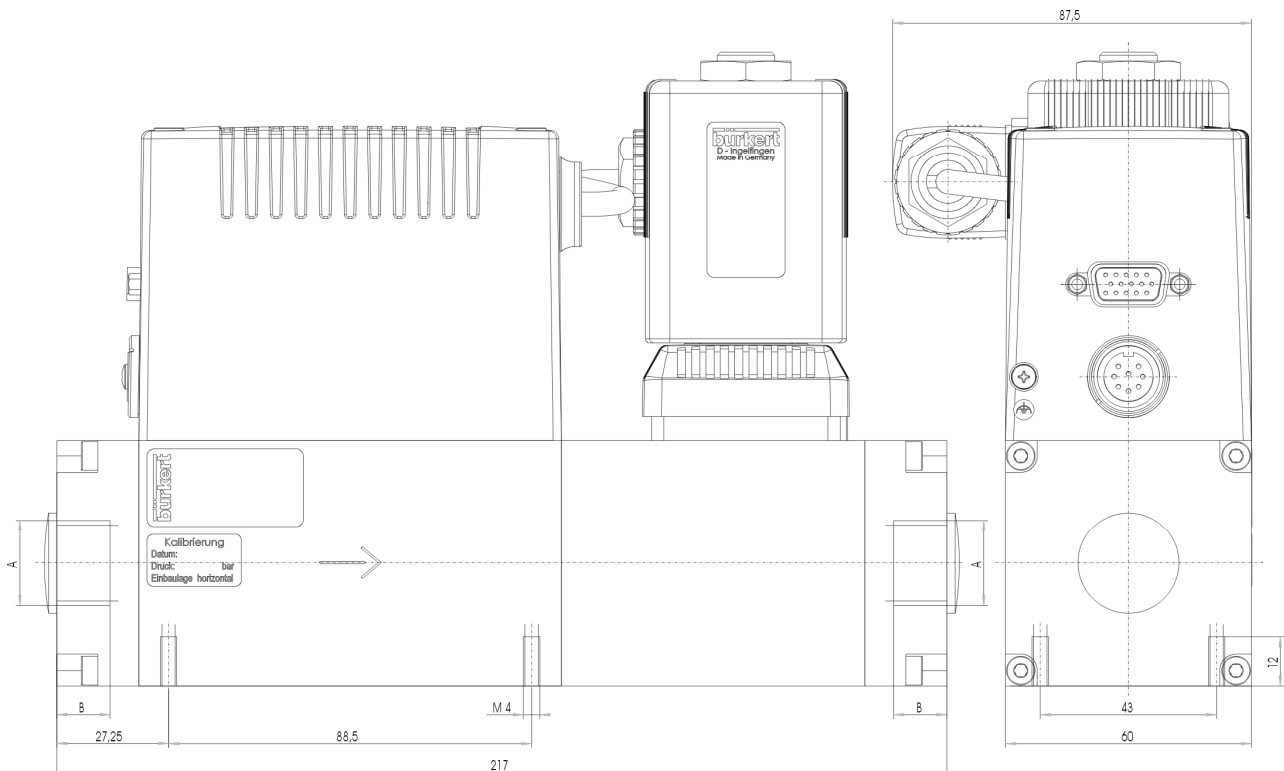
G 3/4; NPT 3/4	15
G 1/2; NPT 1/2	13
A	B

MFC 8626 with valve type 6024 (18W coil) base for high flow rates (can also be combined with other valve types)
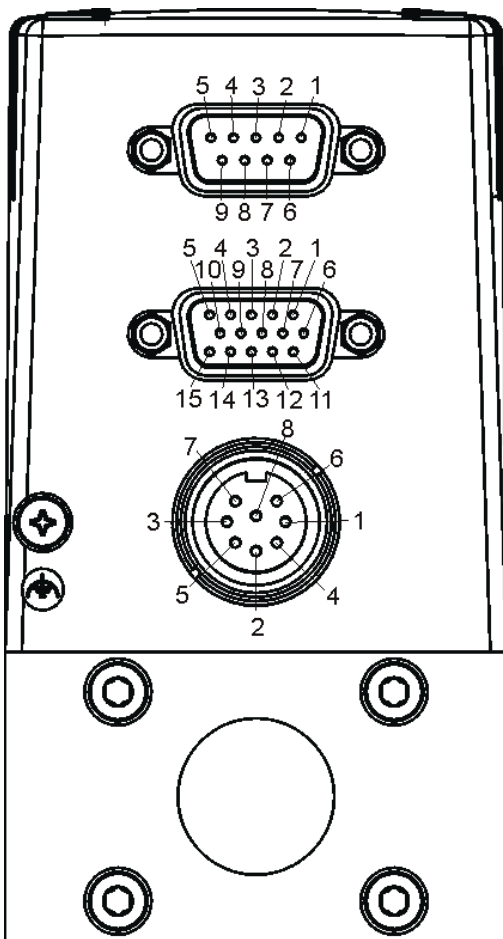
9-pin Sub-D socket:

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	signal input +
2	signal input GND
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 1-3 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^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}	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