Mass Flow Controller (MFC) for gases **Type 8716**

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

PRODUCTINFORMATION

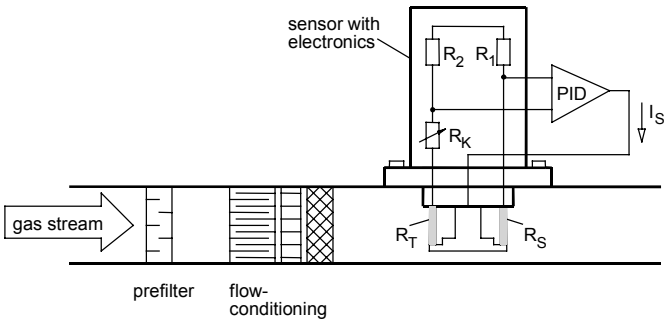
TECHNICAL DATA

Full scale ranges [1] (Q_{nom})	25 to 1500 l_N/min N_2 equivalent
Operating media	neutral, non-contaminated gases, other gases on request
Max. operat. press.	max. 10 barg, depending on the orifice of the valve
Calibration medium	operating gas or air with conversion factor
Medium temperature	-10 to +70 °C
Ambient temp.	-10 to +45 °C
Accuracy (after 15min. warm up time)	±1,5% of rate ±0,5% F.S.
Linearity	±1% F.S.
Repeatability	±0,5% F.S.
Control range	1:50
Settling time ($t_{95\%}$)	< 500 ms
Body material	anodised aluminium or stainless steal 1.4305
Electr. housing material	aluminium (coated)
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
Control valve (proportional valve)	normally closed, N.C.
valve orifice	0,8 bis 12 mm
k_{VS}-value	0,02 bis 2,8 m^3/h
Electr. connection	
round socket	8-pin
sub-HD socket	15-pin
Fieldbus comm.	9-pin sub-D socket

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

Power supply	24 V DC
Voltage tolerance	±10 %
Residual ripple	< 5 %
Power consumption	20 W – max. 32,5 W (depending on specification)
Set point	0-5 V, 0-10 V, 0-20 mA or 4-20mA
Feed impedance	> 20 kΩ (voltage) < 300 Ω (current)
Output signal	0-5 V, 0-10 V, 0-20 mA or 4-20mA
Max. current, voltage output	10 mA
Max. load, current output	600 Ω
Fieldbus communication	Profibus-DP, DeviceNet, others on request
Protection class	IP 65
Dimensions [mm]	see drawings p. 2-4
Total weight (examples)	1,8 kg (Al, 10 W valve) 4,0 kg (VA, 14 W valve)
Mounting position	horizontal or vertical
Light emitting diodes (Default, other allocations possible)	indication for Power, Communication, Limit, Error
Binary input (Default, other functions possible)	three 1. start autotune 2. not assigned 3. not assigned
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
Certification (see operating instructions)	various environmental testing, electromagnetic compatibility

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.

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 main-stream 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.

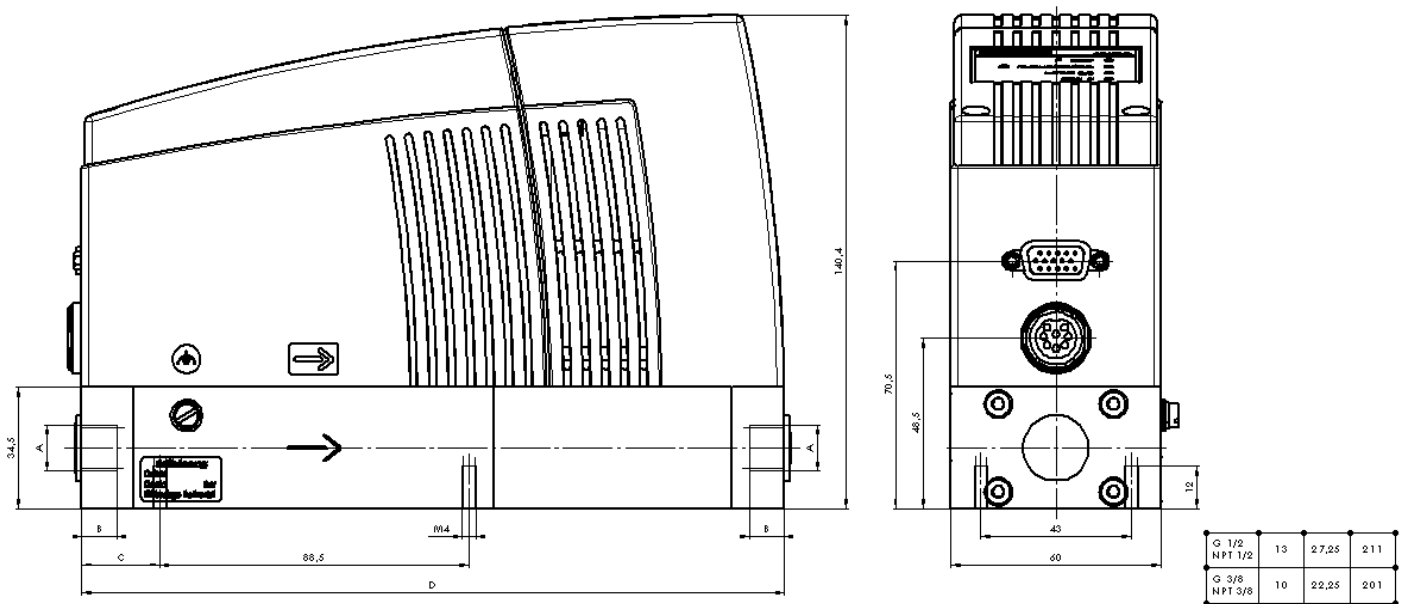
bürkert
Fluid Control Systems

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. 5) 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.

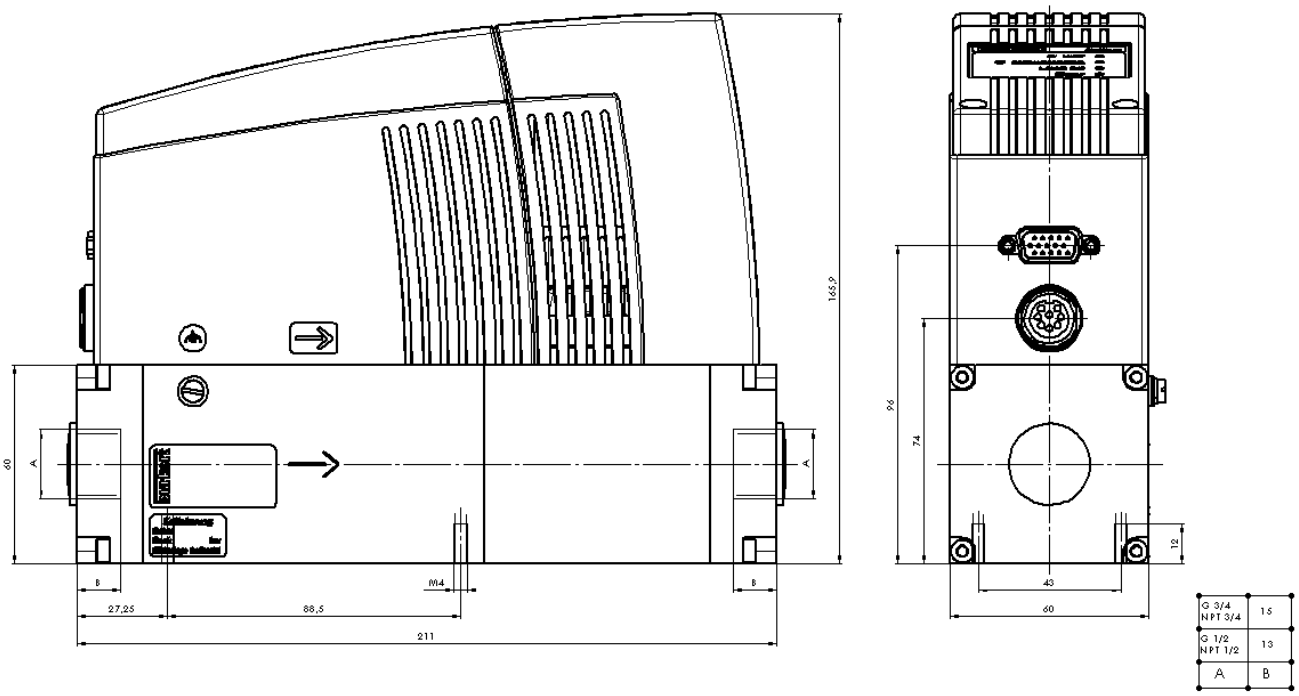
The questionnaire on page 5 contains the relevant fluid specification. Please use in this way the experience of Burkert engineers already in the design phase and provide us with a copy of the questionnaire containing the data of your application together with your inquiry or order.

Dimensions [mm]

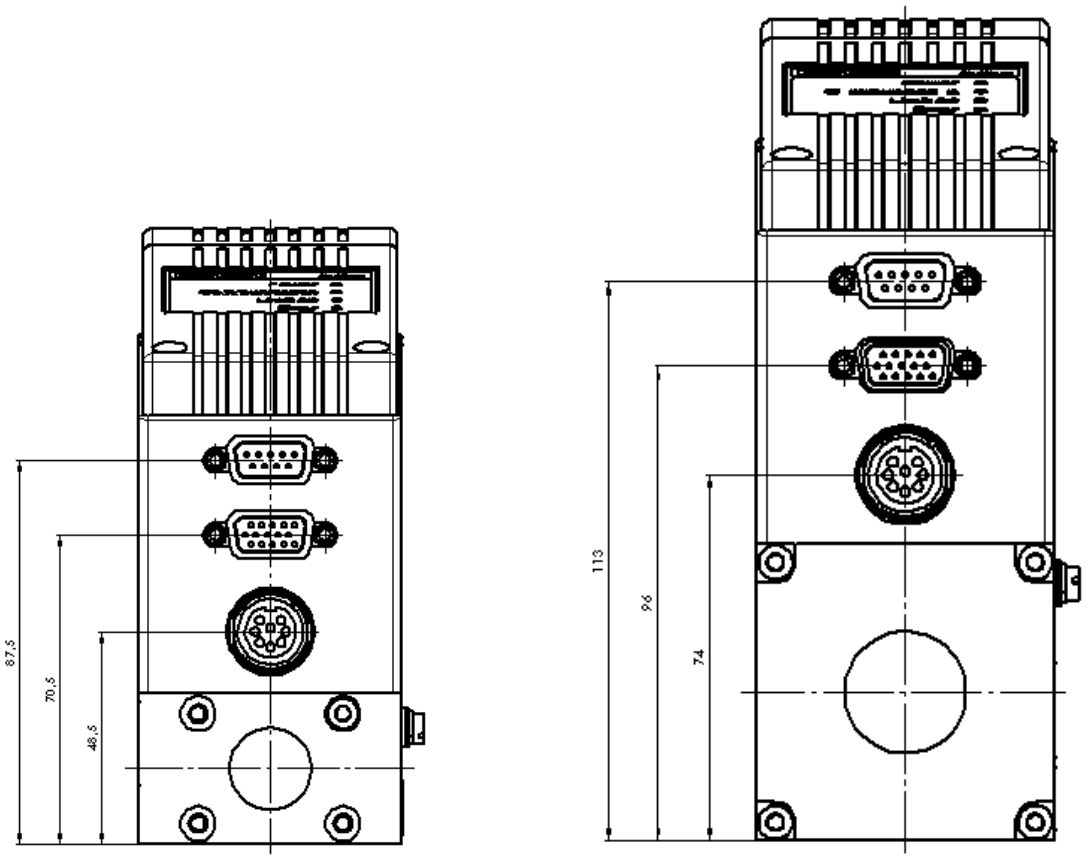


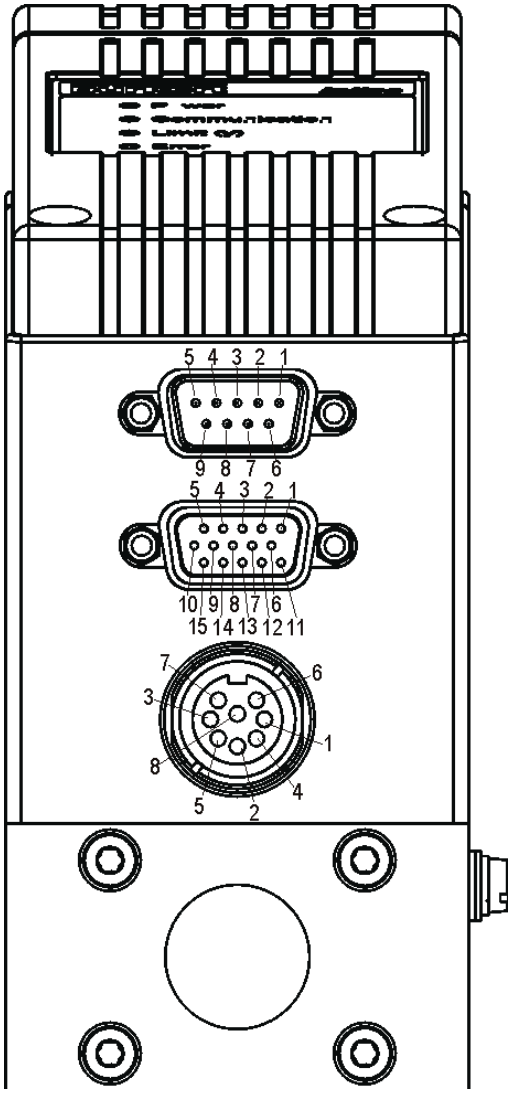
G 1/2 NPT 1/2	13	27,25	211
G 3/8 NPT 3/8	10	22,25	201
G 1/4 NPT 1/4	10	22,25	201
A	B	C	D

High flow rates:



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	signal input + (N.C. with Fieldbus)
2	signal input GND (N.C. with Fieldbus)
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_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} Outlet pressure at Q_{nom}	p_1 = _____ ☐ barg or ☐ psig ■ 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 Fieldbus communication	☐ 0-20mA / 0-20mA ☐ 4-20mA / 4-20mA ☐ 0-10V / 0-10V ☐ 0-5V / 0-5V ☐ **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