DATA SHEET

Type 8713

bürkert
FLUID CONTROL SYSTEMS

Mass Flow Controller for Gases (MFC)

- Nominal flow ranges from 0.010 l/min to 80 l/min
- High accuracy and repeatability
- Very fast settling times
- Digital communication via RS485
- Compact version

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 6013
Plunger valve 2/2 way direct-acting

Type 0330
Direct-acting 2/2 or 3/2-way pivoted armature valve

Type 6027
Direct-acting 2/2 way plunger valve

Type description

The mass flow controller (MFC) type 8713 is suited for regulating the mass flow of gases over a big flow range. The thermal MEMS sensor is located directly in the gas stream and therefore reaches very fast response times. A direct-acting proportional valve from Bürkert guarantees a high sensitivity. The integrated PI controller ensures outstanding control characteristics of the MFC. Type 8713 can optionally be calibrated for two different gases; the user can switch between these two gases. The communication with master devices is fully digital, therefore no further analog/digital conversions are needed. The mass flow controller type 8713 fits for various applications, like e.g. burner controls, heat treatment, material coatings, bio reactors, fuel cell technology or test benches.

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Visit product website

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1. Technical data

Product properties	
Material	
Block	Aluminium or stainless steel
Body	Metal
Seal	FKM, EPDM
Dimensions	Detailed information can be found in chapter "3. Dimensions" on page 4.
Total weight	Approx. 500 g (Aluminium)
LED display	Indication for power, limit (with analogue signals) / communication (with fieldbus) and error
Performance data	
Nominal flow range[1.] (Q_{Nom})	10 ml_N/min[2.]…80 l_N/min (N_2) Detailed information can be found in chapter "6.2. Flow characteristic" on page 8.
Measuring range	1:50, higher measuring range on request
Max. operating pressure	10 bar (145 psi) (depending on control valve used)
Measuring accuracy	±0.8 % o. R. ±0.3 % F. S. (after 1 min. warm up time)
Repeatability	±0.1 % o. R.
Response time (t95 %)	<300 ms
Actuator (normally closed)	
Valve orifice	0.05…4.0 mm
k_{VS} value	0.00006…0.32 m^3/h
Electrical data	
Operating voltage	24 V DC
Power consumption	5 W…11.5 W (depending on control valve used)
Voltage tolerance	±10 %
Residual ripple	<2 %
Electrical connection	D-Sub plug, 9 pin
Medium data	
Operating medium	Neutral, or aggressive gases
Calibration medium	Operating gas or air with conversion factor
Medium temperature	-10 °C…+70 °C (-10 °C…+60 °C for oxygen)
Process/Port connection & communication	
Port connection	NPT ¼, G ¼, screw-in fitting or sub-base, others on request
Digital outputs	One relay-output for: 1. Limit (setpoint cannot be reached) Current output: 25 V, 1 A, 25 VA
Digital inputs	Start Autotune
Digital (communication) interface	Digital via RS485 (half-duplex or full-duplex), RS422
Environment and installation	
Installation position	Horizontal or vertical
Ambient temperature	-10 °C…+50°C[3.]
Degree of protection	IP40
Accessories	
Software-Tool	Mass Flow Communicator

1.) The nominal flow value is the max. flow value calibrated which can be measured.
The nominal flow range defines the range of nominal flow rates (full scale values) possible.

2.) Index N: Flow rates referred to 1.013 bar and 0 °C. Alternatively there is an Index S available which refers to 1.013 bar and 20 °C.

3.) When an internal 5 W valve is used: Max. 40 °C.

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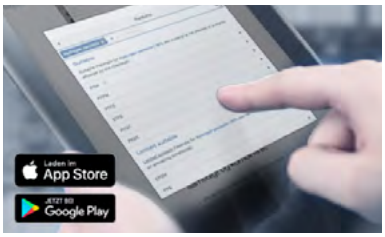
2. Materials

2.1. Chemical Resistance Chart – Bürkert resistApp



Bürkert resistApp – Chemical Resistance Chart

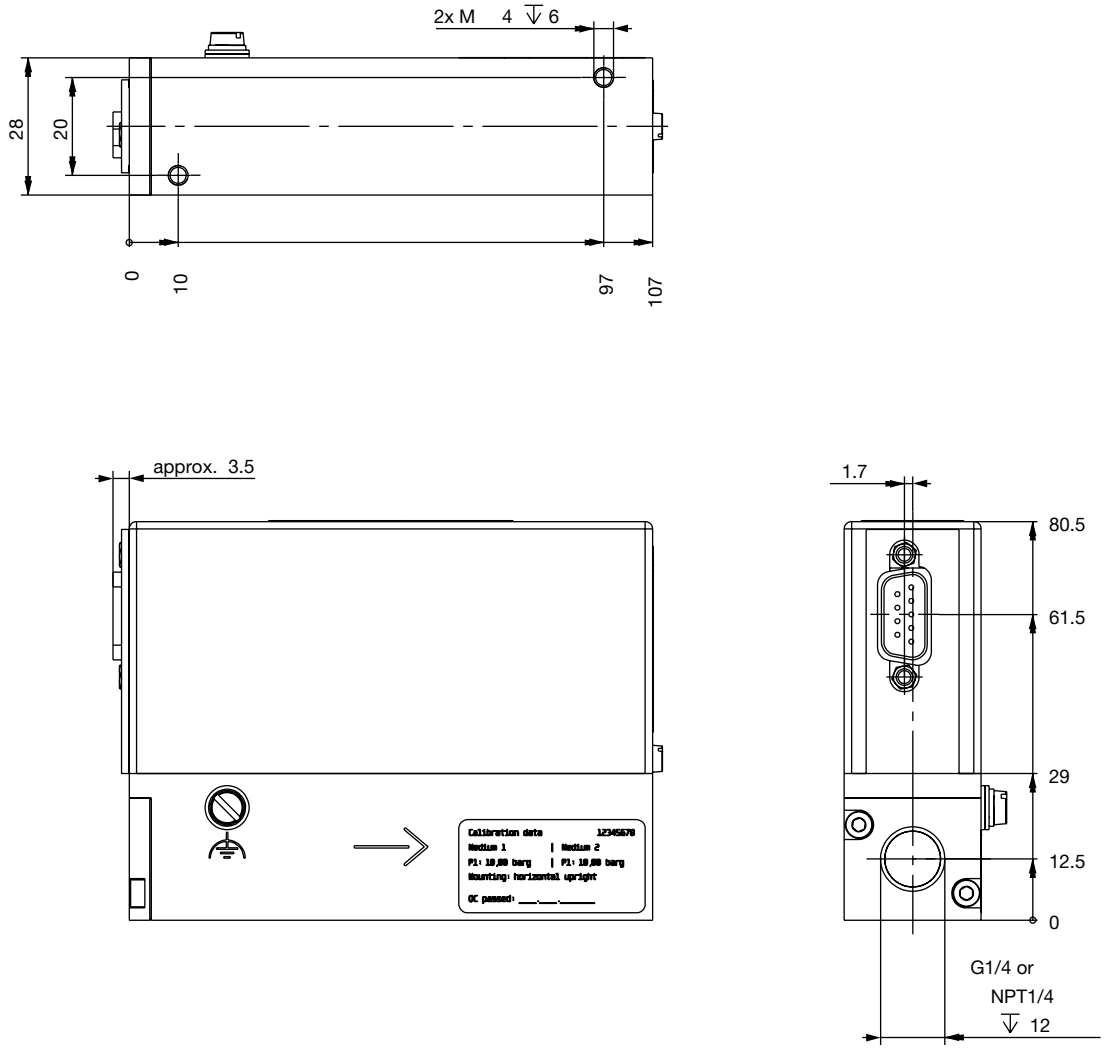
You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

Start Chemical Resistance Check

3. Dimensions

3.1. Threaded version

Note:
Dimensions in mm



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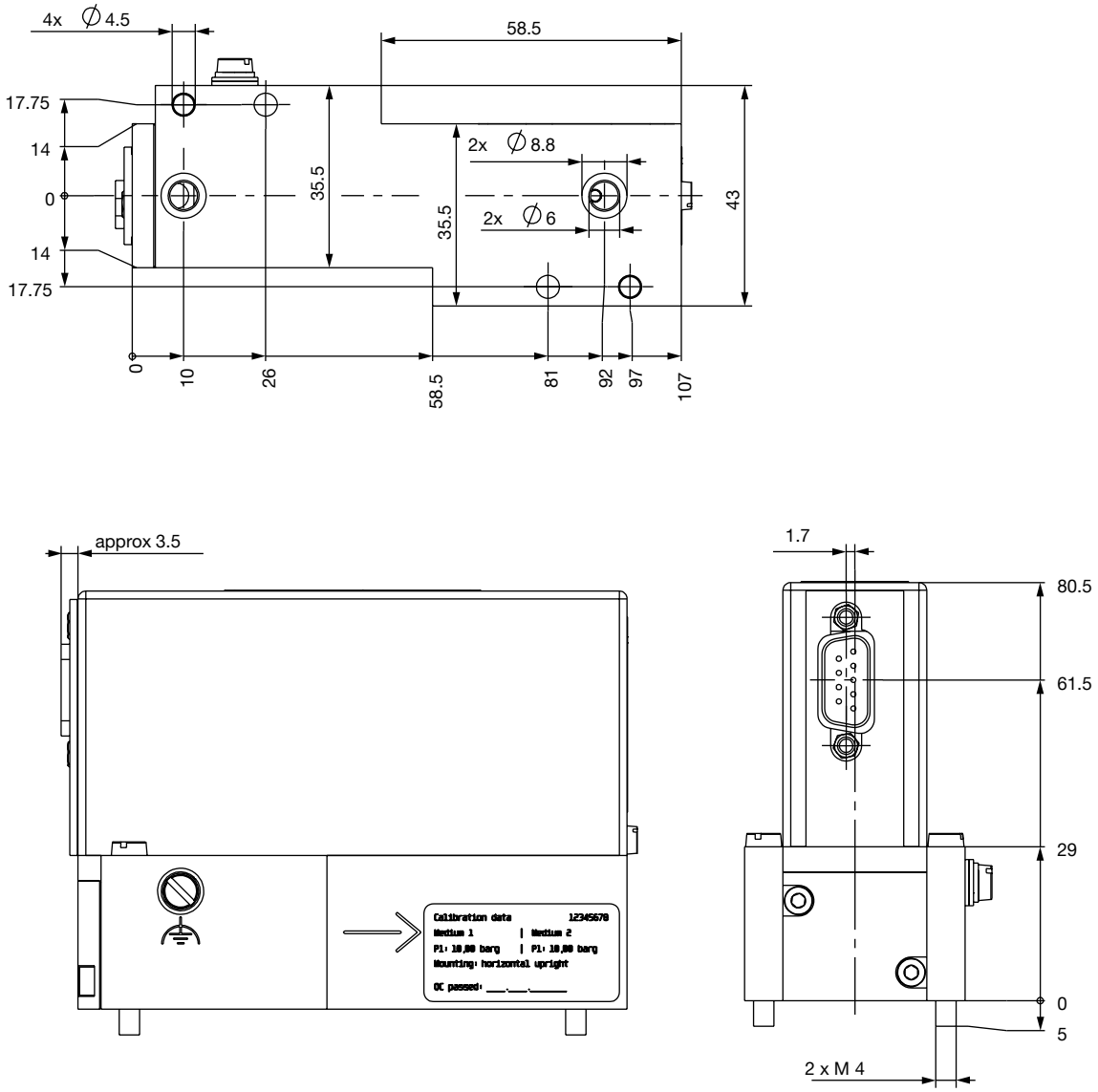
3.2. Sub-base version

Note:
Dimensions in mm



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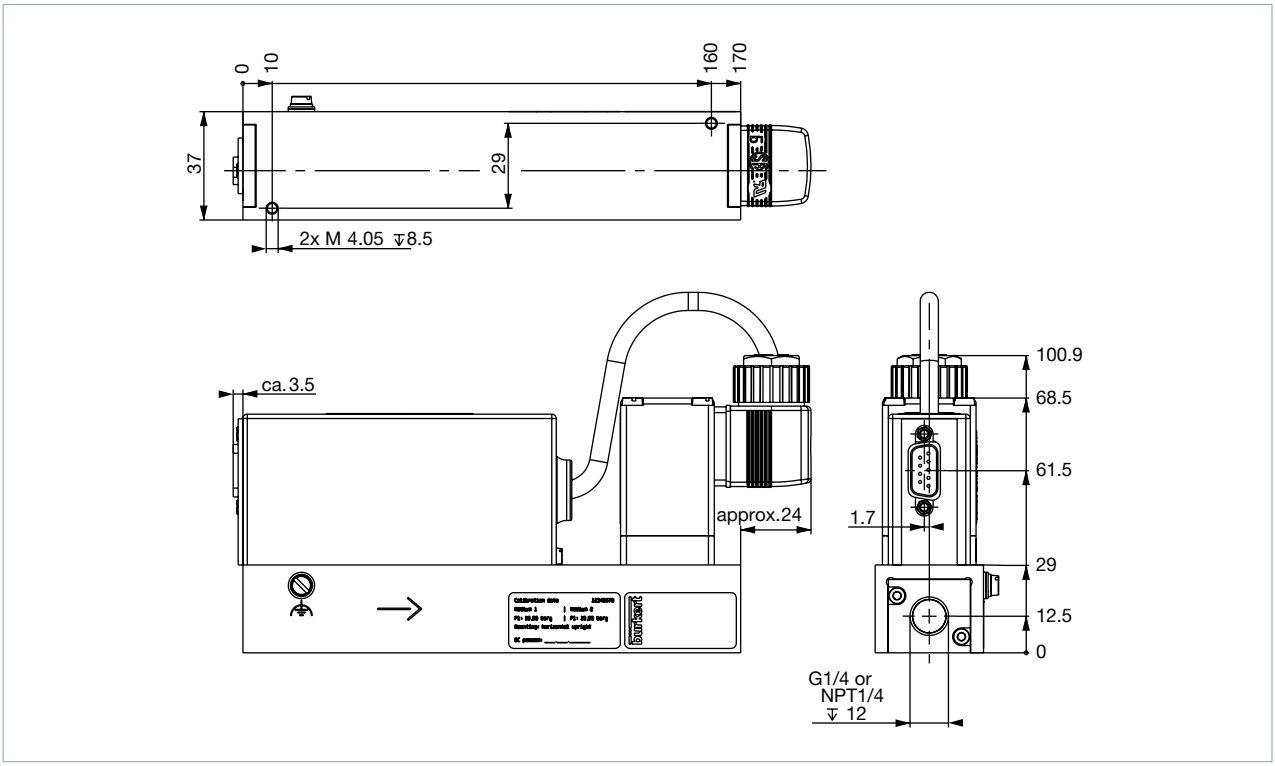
3.3. Version with external valve

Note:
Dimensions in mm

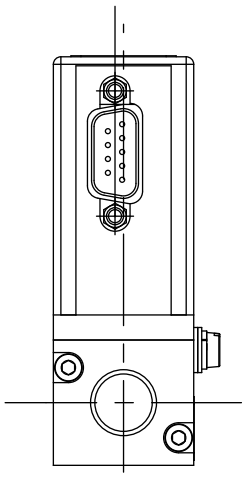


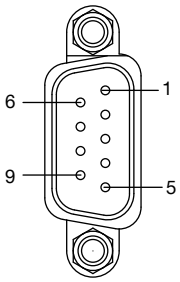
4. Device/Process connections

4.1. Analogue version

Note:

- Optionally pin 7 and pin 8 with bus version as transmitter input possible.
- The cable length for RS232/actual value signal is limited to 30 m.



Plug D-Sub, 9 pin	Pin	Assignment
		Analogue control unit
	1	Binary input (related to GND Pin2)
	2	GND
	3	Power supply +24 V DC
	4	Relay, normally opened
	5	Relay, normally closed
	6	TX+ (RS485-Y) – bridge with pin 9 at half duplex
	7	TX- (RS485-Z) – bridge with pin 8 at half duplex
	8	RX- (RS485-B)
	9	RX+ (RS485-A)

1.) RS232 interface only to be operated via RS232 adapter with integrated level adjustment

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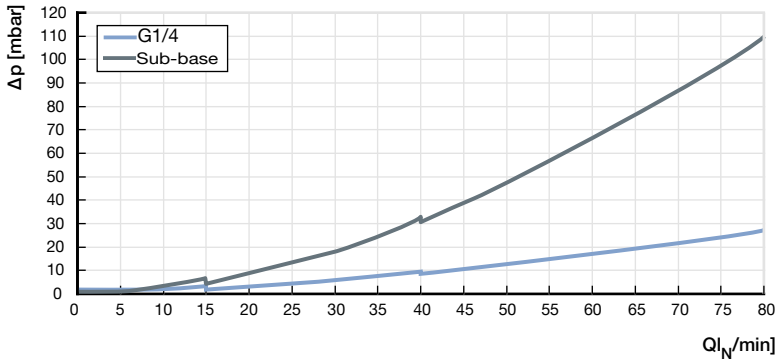
5. Performance specifications

5.1. Pressure loss diagram of MFMs

The diagram shows exemplary the pressure loss characteristics when air flowing through. To determine the pressure loss of another gas, it must first be converted to the corresponding air flow.

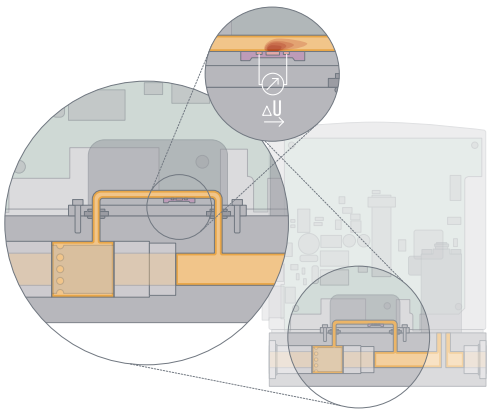


6. Product operation

6.1. Measuring principle

The mass flow sensor operates according to a thermal principle which has the advantage of providing the mass flow which is independent on pressure and temperature.

A small part of the total gas stream is diverted into a small, specifically designed bypassing channel which ensures laminar flow conditions. The sensor element is a chip immersed into the wall of this flow channel. The chip, produced in MEMS technology, contains a heating resistor and two temperature sensors (thermopiles) which are arranged symmetrically upstream and downstream of the heater. The differential voltage of the thermopiles is a measure of the mass flow rate passing the flow sensor. The calibration procedure effectuates a unique assignment of the sensor signal to the total flow rate through the device.



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6.2. Flow characteristic

Nominal flow range of typical gases

Note:

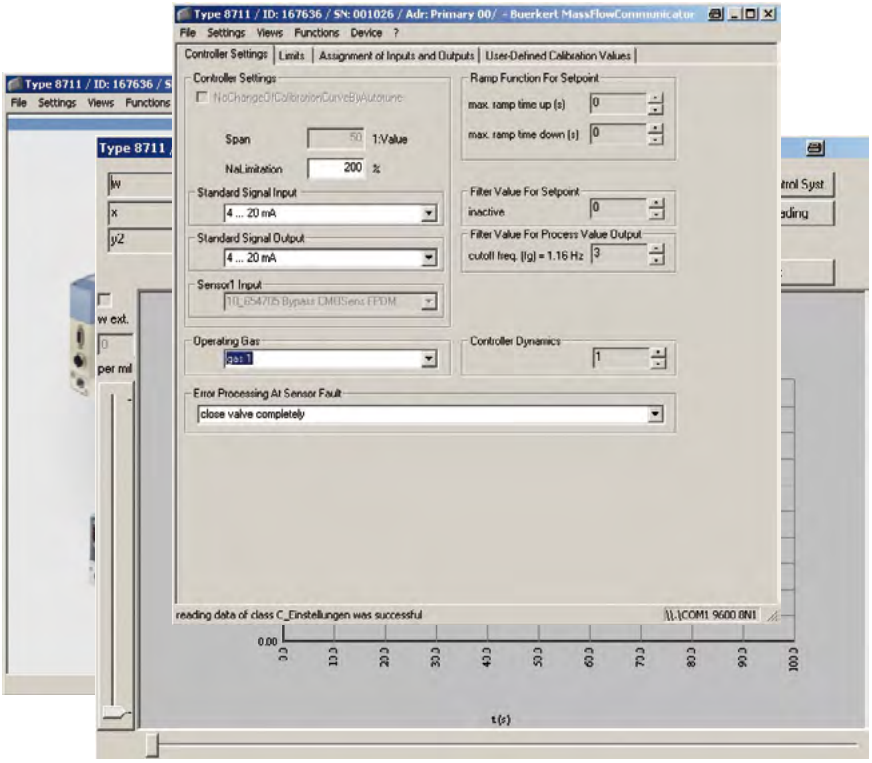
- Q(Gas) = f x Q(N_2)
- When using the gas factors, measurement errors may occur that are outside the data sheet specification. For applications requiring high accuracy, calibration under field conditions is recommended.
- Furthermore, the media compatibility of the sealing materials of the MFM should be checked before use with another gas.

Gas	Min. Q_{Nom} [l_N/min]	Max. Q_{Nom} [l_N/min]
Argon	0.01	80
Helium	0.01	500
Carbon dioxide	0.02	40
Air	0.01	80
Methane	0.01	80
Oxygen	0.01	80
Nitrogen	0.01	80
Hydrogen	0.01	500

6.3. Software Bürkert Communicator

Note:
To install the software, click **here** ▶.

The communication software allows the user to program additionally various functions. For that purpose the MFC or MFM has to be connected to the computer by a RS232 adapter.



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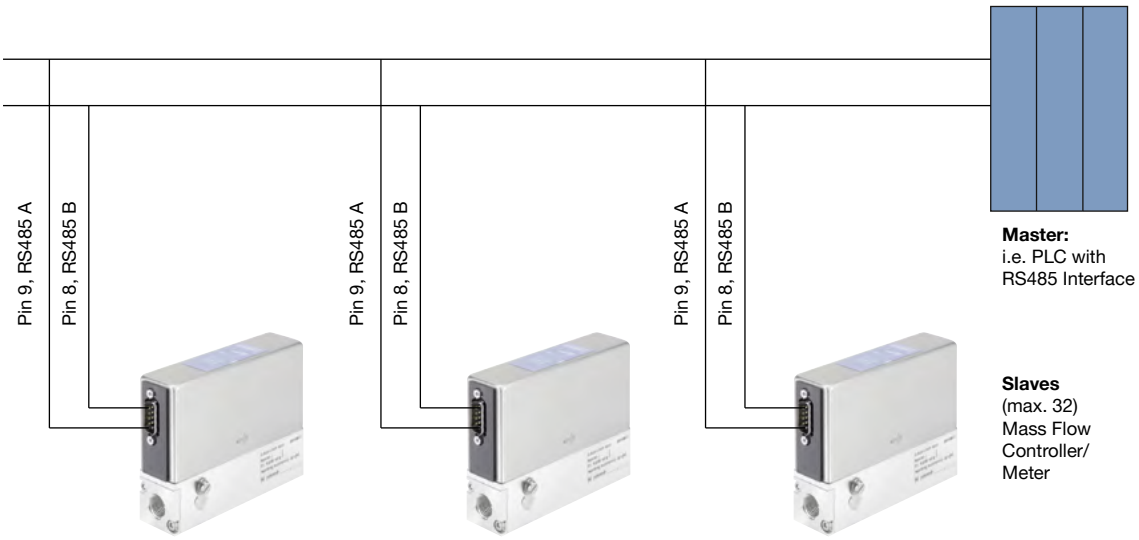
6.4. Networking

Note:
To install the software, click **here** ▶.



7. Ordering information

7.1. Bürkert eShop – Easy ordering and quick delivery

Bürkert eShop – Easy ordering and fast delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

7.2. Recommendation regarding product selection

Note:
Please use the **"Product Enquiry Form"** at the end of the document for the unit design details and send us a copy of the enquiry with information about the application.

Decisive for the proper function of an MFM within the application are the media compatibility, the maximum inlet pressure and the correct selection of the flow measuring range. The pressure loss across the MFM depends on the nominal flow rate and the operating pressure.

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7.3. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements?
Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

7.4. Ordering chart accessories

Note:
The adapters serve mainly for initial operation or diagnosis. Those are not obligatory for continuous operation.

Description	Article no.
Connections/Cables	
Socket D-Sub 9 pin solder connection	917623
Adapter accessories	
USB adapter (Version 1.1, USB socket type B)	670693
USB connection cable 2 m	772299
Communication software Mass Flow Communicator	**LINK**

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Product Enquiry Form - Mass Flow Controller For Gases

Thank you for your interest in our products! In order to provide you with optimum advice, please fill out the following form and send it to your **Bürkert representative** or e-mail address: info@burkert.com. All information submitted will of course be kept strictly confidential.

Please fill in the **required fields**! *

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Personal Information			
Company		**Contact person**	
Customer no.		**Department**	
Street		**Postcode / Town**	
Telephone no.		**Email**	

Delivery

○ MFC Application ○ MFM Application Quantity Required delivery date

Medium data	
Type of gas or gas mixture	
Medium temperature	○ °C / ○ °F
Ambient temperature	○ °C / ○ °F

Fluidic data	
Flow range Q_{Nom}	Min. Max. unit ○ Ref. N[1.] ○ Ref. S[1.]
Inlet pressure at Q_{Nom} [2.]	p_1 = barg[3.]
Outlet pressure at Q_{Nom}	p_2 = barg[3.]
Max. inlet pressure	p_{1max} = barg[3.]
Port connection	○ **Compression fitting** ○ **Subbase** ○ **Vacuum fitting** ○ **Thread:** G (DIN ISO 228/1) ¼" ⅜" NPT (ANSI B1.2) ½" ¾" 1"
Installation	○ horizontal, valve upright ○ horizontal, valve horizontal ○ vertical, upward flow ○ vertical, downward flow[4.]

1.) Reference conditions: Ref. N: T=0°C, P=1,013 bar(a); Ref. S: T=20°C, P=1,013 bar(a)

2.) Corresponds to the calibration pressure

3.) Please indicate all pressure values as overpressure to atmospheric pressure [barg] (g = relative pressure)

4.) Possible reduction of the setting range to 1:10 for a vertical downwards flow

Material specifications		
Body	○ Aluminium	○ Stainless steel
Seals	○ FKM	○ EPDM

Electrical data				
IP protection	○ Yes (IP65)	○ No (IP20 or better)		
Control / Communication **Note:** Please choose **one** of the following options!	**Normsignal**	**CANopen/büS**	**PROFIBUS DP**	**Industrial Ethernet**
	○ 0 … 5 V	○ CANopen		○ PROFINET
	○ 0 … 10 V	○ büS		○ Ethernet IP
	○ 0 … 20 mA			○ Modbus TCP
	○ 4 … 20 mA			○ EtherCAT
Connection **Note:** Please choose **one** of the following options!	○ D Sub socket	○ M12 socket	○ D Sub socket	(RJ45 always standard)
	○ Terminal block	○ Terminal block	○ M12 socket	

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Visit this product area on the website ▸

Approvals / Conformities
☐ UL
☐ ATEX II Cat. 3 G/D, IECEx
☐ USP Class VI conformity
☐ FDA conformity
☐ EG 1935/2004 conformity

Additional Requirements / Comment

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