





### Mass Flow Controller for Gases (MFC)

- Nominal flow ranges from 0.005 l/min to 15 l/min (ref. nitrogen)
- High accuracy and repeatability
- Applicable for aggressive gases
- Easy switch between operating gases
- Optional: fieldbus interface



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

#### Can be combined with

	<p><b>Type 0330</b> ▶ Direct-acting 2/2 or 3/2-way pivoted armature valve</p>
	<p><b>Type 6013</b> ▶ Plunger valve 2/2-way direct-acting</p>

#### Type description

The mass flow controller (MFC) Type 8710 is suitable for controlling aggressive gases, gas mixtures and applications with alternating gases. A thermal capillary sensor, with non-wetted sensor elements, is used for this. The forms in contact with medium are made of high-quality stainless steel and FFKM as seal material for high chemical resistance. Type 8710 can optionally be calibrated for two different gases; the user can switch between these two gases. The MFC achieves high control accuracy thanks to the use of Bürkert proportional valve technology, the application-appropriate layout of the valve orifice and the integrated PI controller. The MFC can be implemented with low pressure loss as required, due to the diversity of the available valve orifices. As electrical interfaces both, analogue standard signals and fieldbuses are available.

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## 1. General technical data

Product properties	
Dimensions	Further information can be found in chapter "4. Dimensions" on page 5.
Material	
Seal	FKM, EPDM or FFKM
Housing	PC (polycarbonate)
Base block	Stainless steel
Total weight	850 g (stainless steel)
LED display	Status indication: 1. Power 2. Communication (only in fieldbus variant), limit (only in analogue variant) 3. Error
Performance data	
Nominal flow range ( $Q_N$ ) <sup>1)</sup>	5...15000 ml/min ( $N_2$ ) <sup>2)</sup> Further information can be found in chapter "6.1. Nominal flow range of typical gases" on page 8.
Operating pressure <sup>3)</sup>	Max. 10 bar (145 psi) (depending on the nominal valve size)
Measuring accuracy	± 1.5 % of reading ± 0.3 % FS (under calibration conditions and after 30 min warm-up time to achieve best measurement results)
Repeatability	± 0.1 % FS
Turndown ratio	1:50
Response time ( $t_{95\%}$ )	< 3 s
Electrical data	
Operating voltage	24 V DC
Power consumption	Max. 3.5...10 W (depending on the proportional valve used)
Residual ripple	< 2 %
Voltage tolerance	± 10 %
Electrical connection	
Standard	D-Sub plug, 15-pin
Additionally with PROFIBUS DP	M12 socket, 5-pin
Additionally with CANopen	M12 plug, 5-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	
Analogue interfaces	4...20 mA, 0...20 mA, 0...10 V or 0...5 V Input impedance > 20 kΩ (voltage) resp. < 300 Ω (current) Maximum current: 10 mA (voltage output) Maximum load: 600 Ω (current output)
Digital outputs	1 relay output: 1. Limit (desired value cannot be reached) Loading capacity: max. 25 V, 1 A, 25 VA
Digital inputs	2 digital inputs: 1. Start Autotune 2. Not assigned
Digital communication interface	Via RS adapter: RS232, RS485, Modbus RTU, PROFIBUS DP, CANopen (see "8.4. Ordering chart accessories" on page 10)
Port connection	NPT 1/4, G 1/4, screw-in fitting, sub-base
Approvals and conformities	
Protection class	IP40
Environment and installation	
Installation position	Horizontal or vertical
Ambient temperature	- 10 °C...+ 50 °C

1.) The nominal flow rate is the maximum calibrated and measurable flow rate value. The nominal flow range indicates the range of possible nominal flow rates.

2.) Index N: flow rates with respect to 1.013 bar abs and 0 °C, alternatively Index S: flow values with respect to 1.013 bar abs and + 20 °C

3.) Overpressure to atmospheric pressure

## 2. Approvals and conformities

### 2.1. General notes

- The approvals and conformities listed below must be stated when making enquiries. This is the only way to ensure that the product complies with all required specifications.
- Not all available variants can be supplied with the below mentioned approvals or conformities.

### 2.2. Conformity

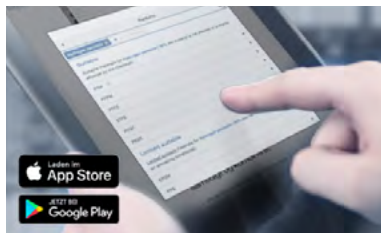
In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

### 2.3. Standards

The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

## 3. Materials

### 3.1. 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](#)

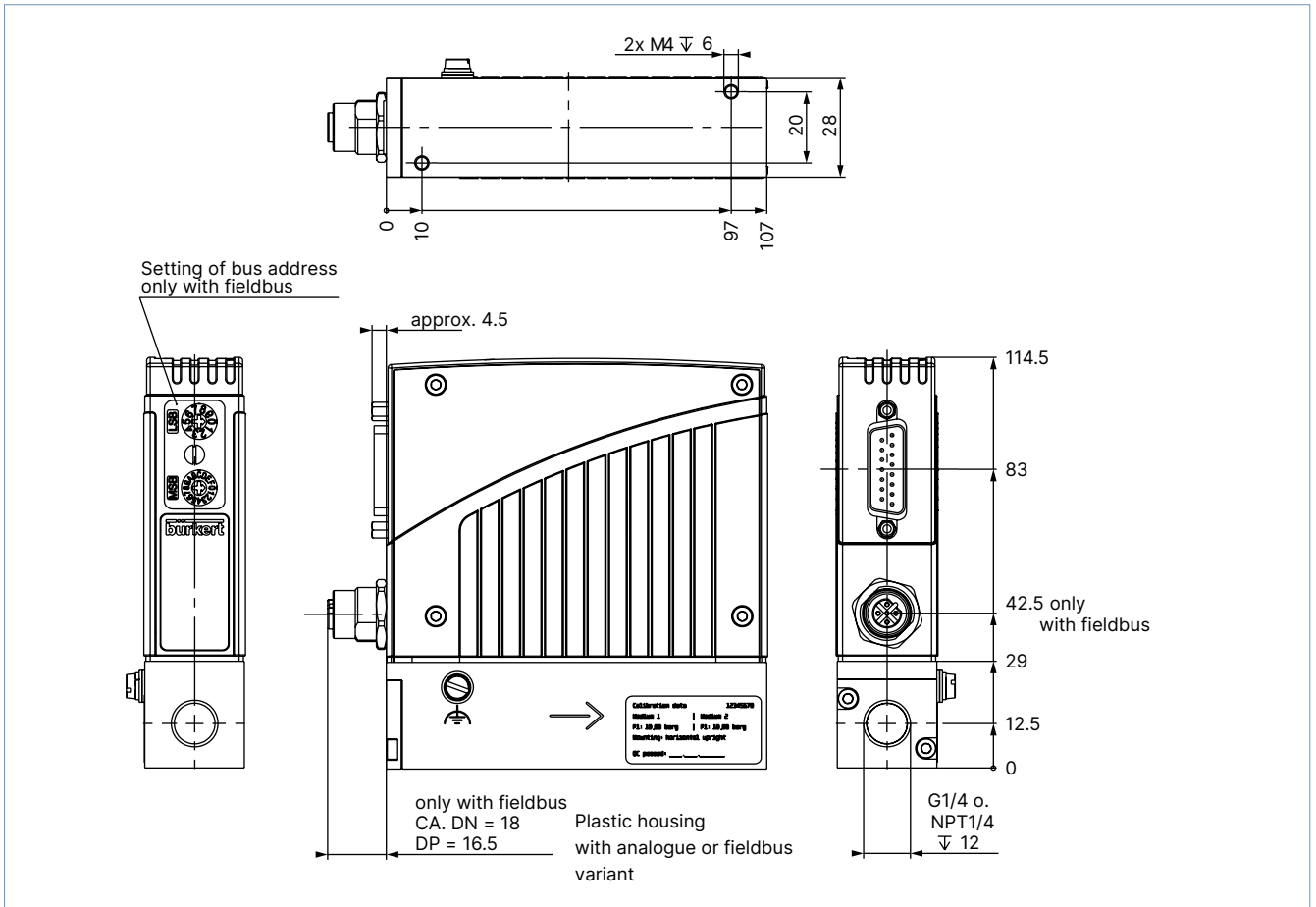
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## 4. Dimensions

### 4.1. Threaded variant

**Note:**

Dimensions in mm

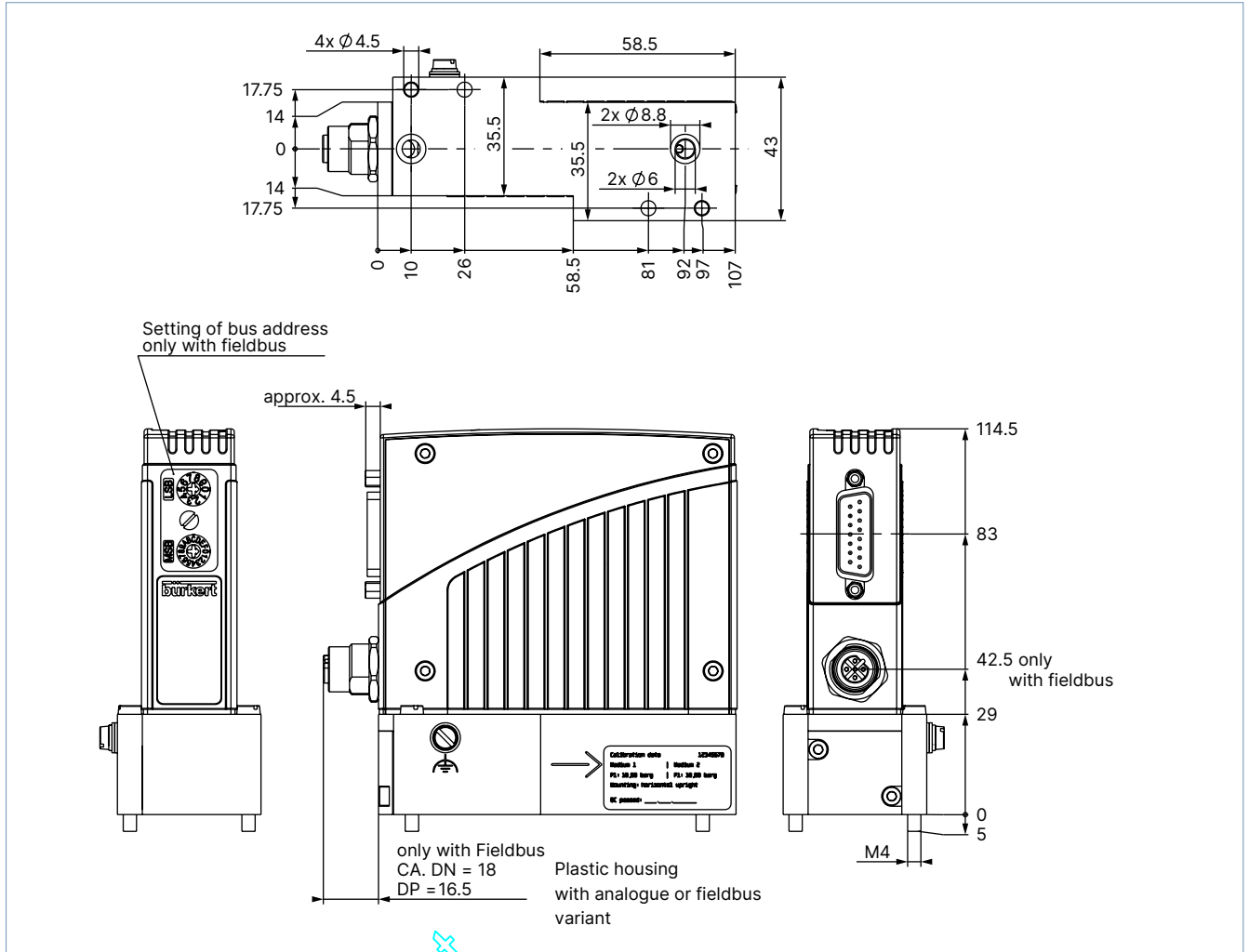


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4.2. Sub-base variant

Note:

Dimensions in mm



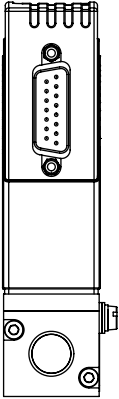
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## 5. Device/Process connections

### 5.1. Analogue variant

**Note:**

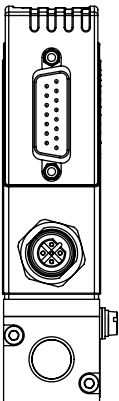
The cable length for RS232/actual value signal is limited to 30 meters.



D-Sub plug, 15-pin	Pin	Assignment	
		Analogue control unit	Bus actuation
	1	Relay – normally closed	
	2	Relay – normally open	
	3	Relay – middle contact	
	4	GND for 24 V supply and binary inputs	
	5	24 V supply +	
	6	Only for in-plant use (do not connect)	
	7	Not connected	Not connected
	8	Not connected	Not connected
	9	Actual value output GND	Not connected
	10	Actual value output +	Not connected
	11	DGND (for RS232) <sup>1)</sup>	
	12	Binary input 1	
	13	Binary input 2	
	14	RS232 RxD (without driver) <sup>1)</sup>	
	15	RS232 TxD (without driver) <sup>1)</sup>	

1.) RS232 communication is only possible when using an RS232 adapter, see "8.4. Ordering chart accessories" on page 10.

### 5.2. Fieldbus variant



PROFIBUS DP: M12 socket, B-coded (DP max. 12 MBaud)	Pin	Assignment
	1	VDD (only for termination resistor)
	2	RxD/TxD – N (A-Line)
	3	DGND
	4	RxD/TxD – P (B-Line)
	5	Not connected

CANopen: M12 plug, A-coded	Pin	Assignment
	1	Shielding
	2	Not connected
	3	DGND
	4	CAN_H
	5	CAN_L

## 6. Performance specifications

### 6.1. Nominal flow range of typical gases

**Note:**

- $Q(\text{Gas}) = f \times Q(\text{N}_2)$
- By using the gas factors, it is possible that the accuracy is not within the datasheet specification. For applications which need high accuracy it is recommended to calibrate under application conditions.
- The compatibility of the sealing materials of the MFMs should be checked before use with another gas.

Gas	Factor f
N <sub>2</sub>	1.00
Air	1.00
O <sub>2</sub>	0.98
H <sub>2</sub>	1.01
Ar	1.4
He	1.42
CO <sub>2</sub>	0.77

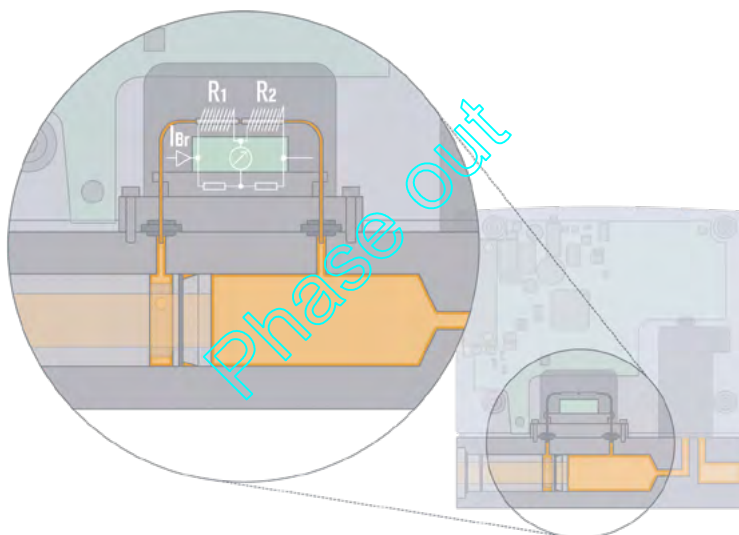
## 7. Product operation

### 7.1. Measuring principle

The measurement is based on the bypass principle. A laminar flow element in the main channel generates a small pressure drop. This drives a small flow, proportional to the main flow, through the bypass (sensor tube). Two heating resistors, which are connected in a measuring bridge, are wound on this stainless steel tube. In the zero-flow state, the bridge is balanced, but with flow, heat is transported in the flow direction and the bridge becomes unbalanced. The dynamics of the measurement is limited by the tube walls, which act as a thermal barrier.

With contaminated gases we recommend to install filter elements upstream. This avoids changes in the division ratio between main flow and sensor tube, as well as changes in the heat transmission caused by deposits on the walls of the sensor tube.

With these sensors even aggressive gases can be measured, because all essential parts in contact with the gas are fabricated in stainless steel. With this sensor principle it is also possible to convert between different gases.



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## 8. Ordering information

### 8.1. Bürkert eShop



#### Bürkert eShop – Easy ordering and quick 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](#)

### 8.2. Recommendation regarding product selection

**Note:**

Contact your Bürkert partner for device design.

The media compatibility, the maximum inlet pressure and the correct selection of the flow measuring span are decisive for the proper function of the device within the application. The pressure loss depends on the nominal flow rate and operating pressure.

### 8.3. 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](#)

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## 8.4. Ordering chart accessories

### Overview of accessories

#### Note:

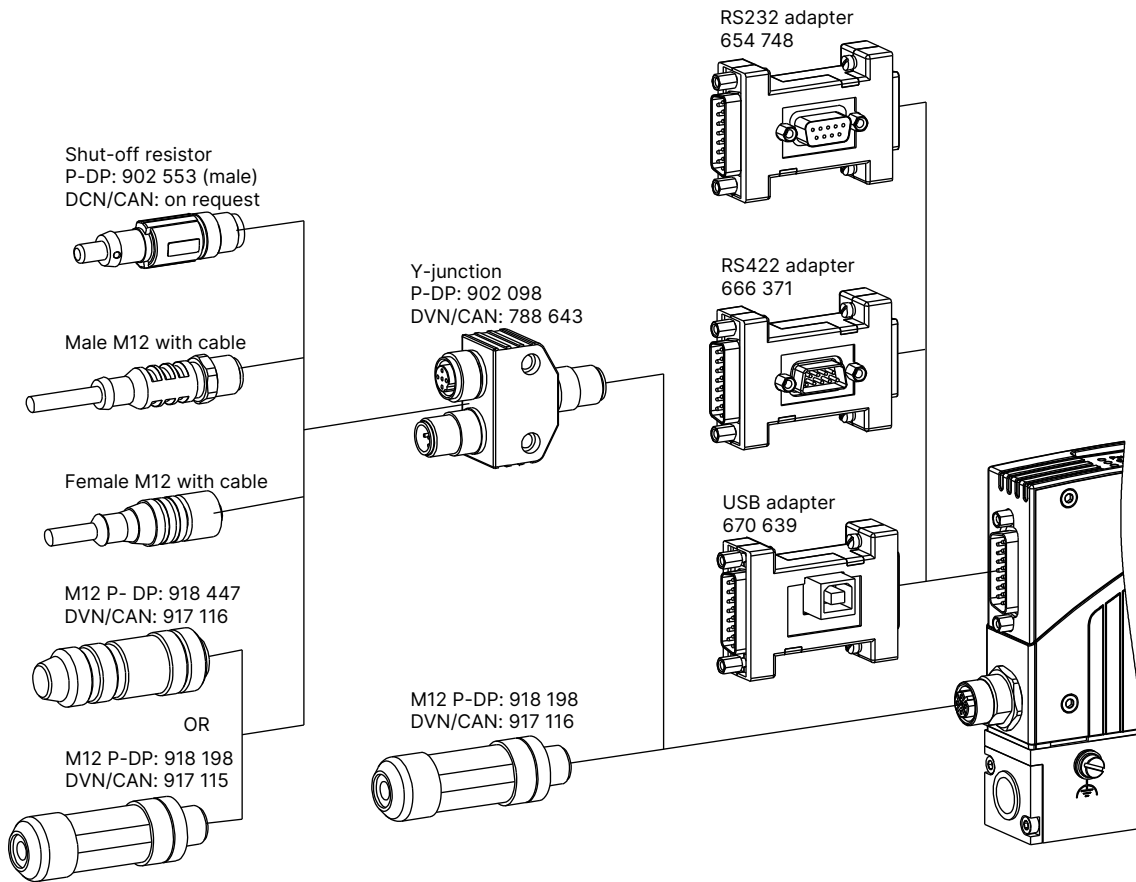
The adapters serve mainly for initial operation or diagnosis. Those are not obligatory for continuous operation.

Description	Article no.
<b>Connections/Cables</b>	
D-Sub socket, 15-pin, soldered connection	918274 
Bonnet for D-Sub socket, with screw lock	918408 
D-Sub socket with cable, 15-pin, cable length: 5 m, assembled on one side	787737 
D-Sub socket with cable, 15-pin, cable length: 10 m, assembled on one side	787738 
<b>Adapters</b>	
RS232 adapter	654748 
Extension cable for RS232, M12 socket and/or M12 plug, 9-pin, cable length: 2 m	917039 
RS422 adapter (RS485-compatible)	666371 
USB adapter	670639 
USB connection cable, cable length: 2 m	772299 
<b>Accessories for Fieldbus</b>	
<b>PROFIBUS DP (B-coded)</b>	
M12 plug, 5-pin, straight, B-coded <sup>1)</sup>	918198 
M12 socket (coupling), straight <sup>1)</sup>	918447 
Y-distributor <sup>1)</sup>	902098 
PROFIBUS terminating resistor, M12 plug, B-coded	902553 
GSD file (PROFIBUS), EDS file (CANopen)	<b>LINK ►</b>
<b>CANopen (A-coded)</b>	
M12 plug, 5-pin, straight <sup>1)</sup>	917115 
M12 circular socket with plastic threaded clamping ring, 5-pin, straight, to be wired <sup>1)</sup>	917116 
Y push-in connector, M12, 5-pin, LUM <sup>1)</sup>	788643 
Termination resistor	On request
GSD file (PROFIBUS), EDS file (CANopen)	<b>LINK ►</b>

1.) For space reasons, M12 individual cable plugs may not be suitable for simultaneous use on the same side as a Y-distributor. Use a commercially available covered cable in this case.

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Adapter sketch



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