



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
- IP 65 protection class
- Optional: Fieldbus interface

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 8712 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 8712 can optionally be calibrated for two different gases; the user can switch between these two gases. As electrical interfaces both, analog standard signals and fieldbuses are available. The mass flow controller type 8712 fits for various applications, like e.g. burner controls, heat treatment, material coatings, bio reactors, fuel cell technology or test benches. This MFC is especially designed for use in harsh environments due to the high protection class.

Phase out

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1. General technical data

Product properties	
Dimensions	Further information can be found in chapter "4. Dimensions" on page 6.
Material	
Seal	FKM or EPDM (others on request)
Housing	PC (polycarbonate)
Base block	Stainless steel
Total weight	1200 g (including internal valve)
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) ¹⁾	0.01 ml/min...80 l/min (N_2) ²⁾ Further information can be found in chapter "6.1. Nominal flow range of typical gases" on page 10.
Operating pressure ³⁾	Max. 10 bar (145 psi) (depending on the nominal valve size)
Measuring accuracy	± 0.8 % of reading ± 0.3 % FS (under calibration conditions and after 1 min warm-up time to achieve best measurement results)
Repeatability	± 0.1 % FS
Turndown ratio	1:50 (higher on request)
Response time ($t_{95\%}$)	< 300 ms
Electrical data	
Operating voltage	24 V DC
Power consumption	8.5...14 W (for analogue variant: depending on proportional valve)
Residual ripple	< 2 %
Voltage tolerance	± 10 %
Electrical connection	
Standard	M16 socket, round, 8-pin and D-Sub socket HD15, 15-pin
Additionally with PROFIBUS DP	M12 socket, 5-pin (for IP65) or D-Sub socket, 9-pin
Additionally with CANopen	M12 plug, 5-pin
Medium data	
Operating medium	Neutral, pure gases (others on request)
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	2 relay outputs: 1. Limit (desired value cannot be reached) 2. Error (i.e. sensor fault) Loading capacity: max. 60 V, 1 A, 60 VA
Digital inputs	3 digital inputs: 1. Start Autotune 2. Not assigned, e.g. to switch between 2 calibrated gases 3. Not assigned
Digital communication interface	RS232, Modbus RTU (via RS adapter), RS485, RS422 or USB (via adapter) Fieldbus option: PROFIBUS DP, CANopen (see "8.4. Ordering chart accessories" on page 12)
Port connection	NPT 1/4, G 1/4 (screw-in fitting on request)
Approvals and conformities	
Protection class (with connected cables)	IP65
North America (USA/Canada)	Further information can be found in chapter "2.4. North America (USA/Canada)" on page 4.
Foods and Beverages/Hygiene	Further information can be found in chapter "2.5. Foods and beverages/Hygiene" on page 4.
Oxygen	Further information can be found in chapter "2.6. Oxygen" on page 4.

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.

2.4. North America (USA/Canada)

Approval	Description
	Optional: UL Listed for the USA and Canada The products are UL Listed for the USA and Canada according to: - UL 61010-1 (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE – Part 1: General Requirements) - CAN/CSA-C22.2 No. 61010-1

2.5. Foods and beverages/Hygiene

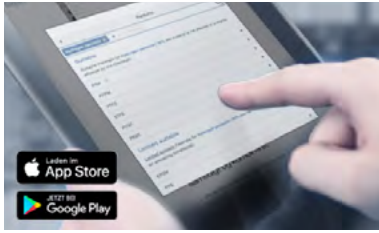
Conformity	Description
FDA	FDA – Code of Federal Regulations (valid for variable code PL02, PL03) All wetted materials are compliant with the Code of Federal Regulations published by the FDA (Food and Drug Administration, USA) according to the manufacturer's declaration.
USP	United States Pharmacopeial Convention (USP) (valid for variable code PL04) All wetted materials are biocompatible according to the manufacturer's declaration.
	EC Regulation 1935/2004 of the European Parliament and of the Council (valid for variable code PL01, PL02) All wetted materials are compliant with EC Regulation 1935/2004/EC according to the manufacturer's declaration.

2.6. Oxygen

Conformity	Description
	Optional: Suitability for oxygen (valid for the variable code NL02) The products are suitable for use with gaseous oxygen, according to the manufacturer's declaration.

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.

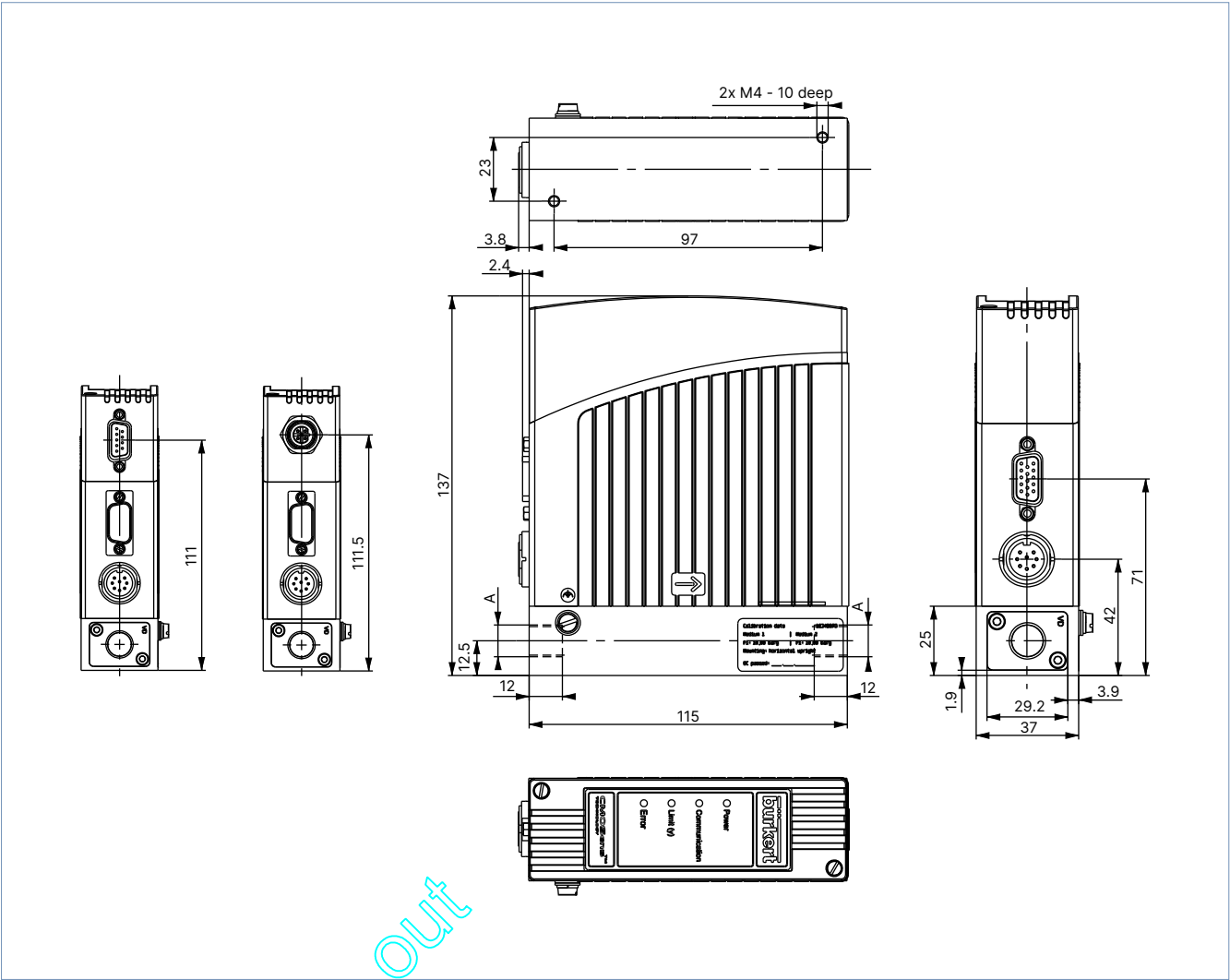
[Start chemical resistance check](#)

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4. Dimensions

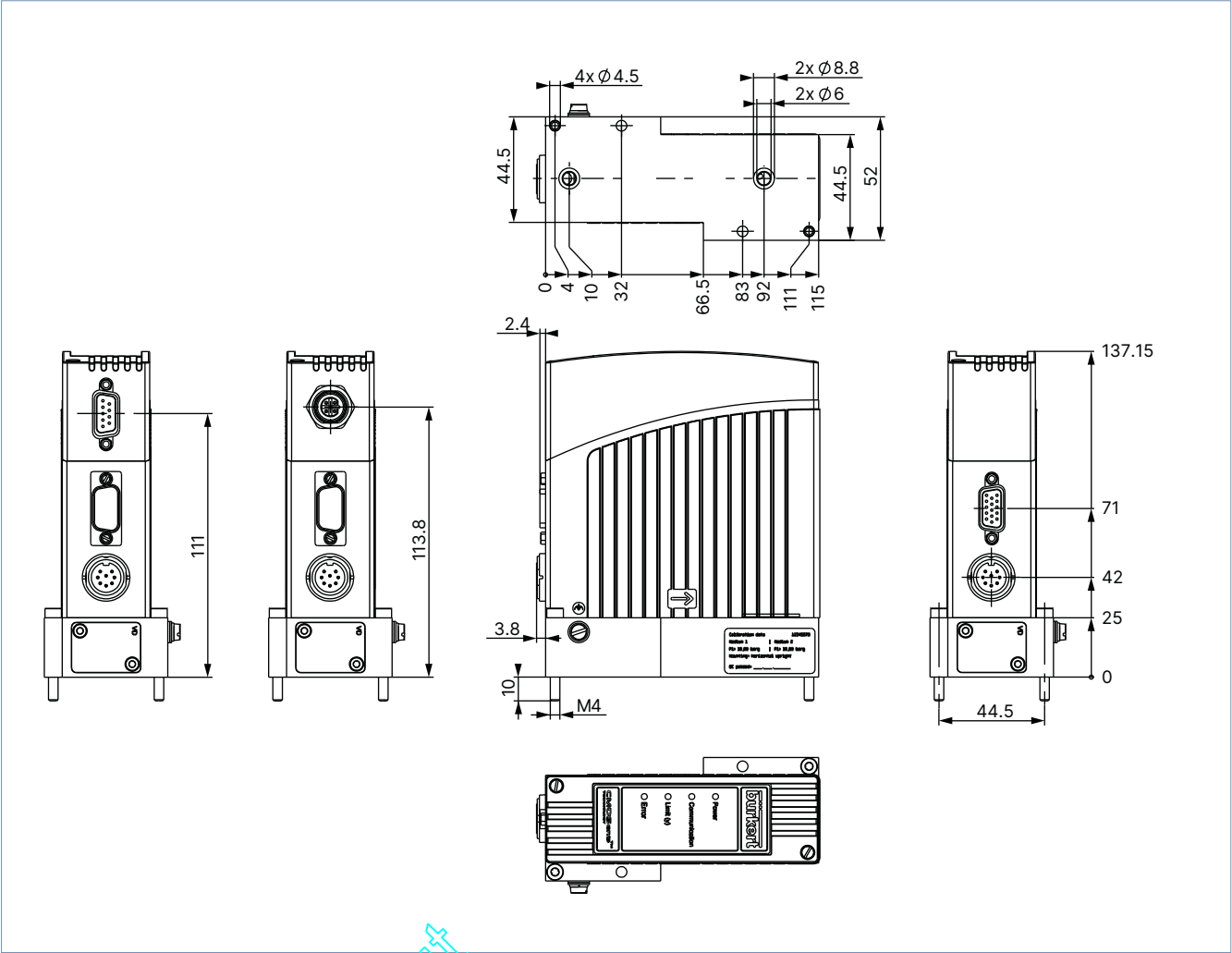
4.1. Threaded variant

Note:
Dimensions in mm



4.2. Sub-base variant

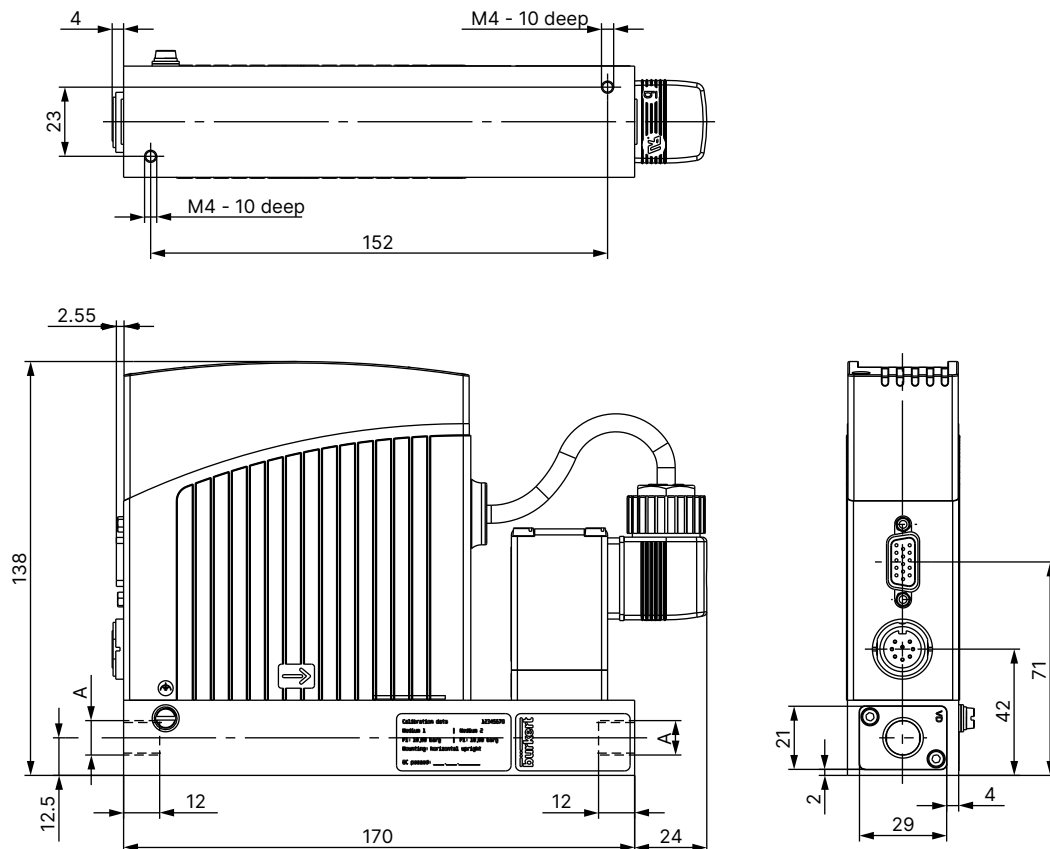
Note:
Dimensions in mm



Phase out

Note:

Dimensions in mm

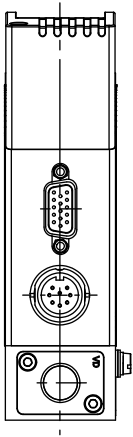


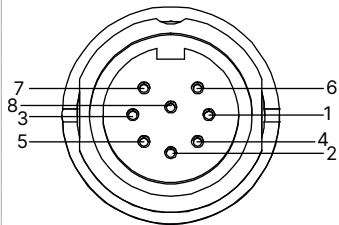
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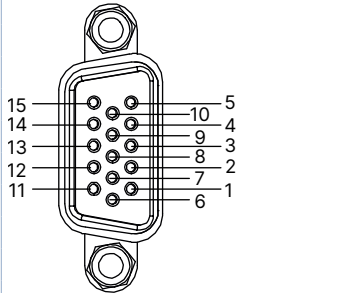
5. Device/Process connections

5.1. Analogue variant

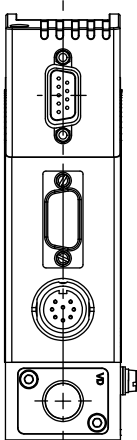
Note:
The cable length for RS232/actual value signal is limited to 30 meters.

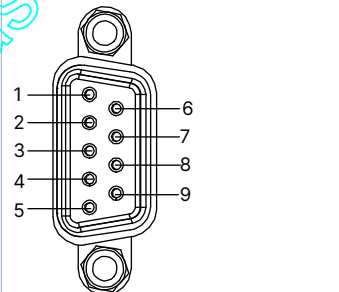


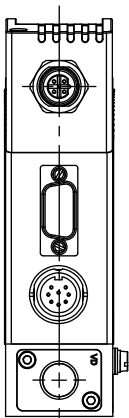
M16 socket, round, 8-pin	Pin	Assignment
	1	24 V supply +
	2	Relay 1 – reference contact
	3	Relay 2 – reference contact
	4	Relay 1 – normally closed
	5	Relay 1 – normally open
	6	24 V supply GND
	7	Relay 2 – normally open
	8	Relay 2 – normally closed

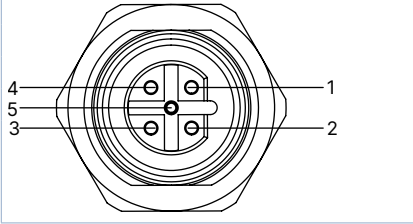
D-Sub HD15 socket, 15-pin	Pin	Assignment	
		Analogue control unit	Bus control
	1	Set value input +	Not connected
	2	Set value input GND	Not connected
	3	Actual value output +	Not connected
	4	Binary input 2	
	5	12 V output (only for in-plant use)	
	6	RS232 TxD (direct connection to computer)	
	7	Binary input 1	
	8	GND (for binary inputs)	
	9	Only for in-plant use (do not connect)	
	10	12 V output (only for in-plant use)	
	11	12 V output (only for in-plant use)	
	12	Binary input 3	
	13	Actual value output GND	Not connected
	14	RS232 RxD (direct connection to computer)	
	15	DGND (for RS232 interface)	

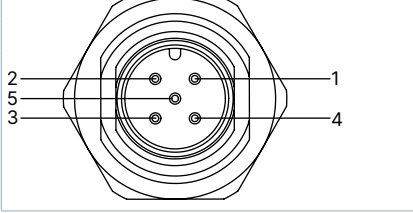
5.2. Fieldbus variant



D-Sub socket, 9-pin	Pin	Assignment	
		PROFIBUS DP	CANopen
	1	Shielding	Shielding
	2	Not connected	CAN_L data line
	3	RxD/TxD - P (B-line)	GND
	4	RTS (control signal for repeater)	Not connected
	5	GND	Not connected
	6	VDD (only for termination resistor)	Not connected
	7	Not connected	CAN_H data line
	8	RxD/TxD - N (A-line)	Not connected
	9	Not connected	Not connected



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 ^{1.)}
	3	DGND
	4	CAN_H
	5	CAN_L

1.) Optional assignment with 24 V DC possible for power supply via fieldbus connector. With this no power supply connection on round M16 plug needed.

6. Performance specifications

6.1. Nominal flow range of typical gases

Note:
All values regarding 1.013 bar abs and 0 °C (Index N)

Gas	Min. Q _N	Max. Q _N
	[l/min]	[l/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

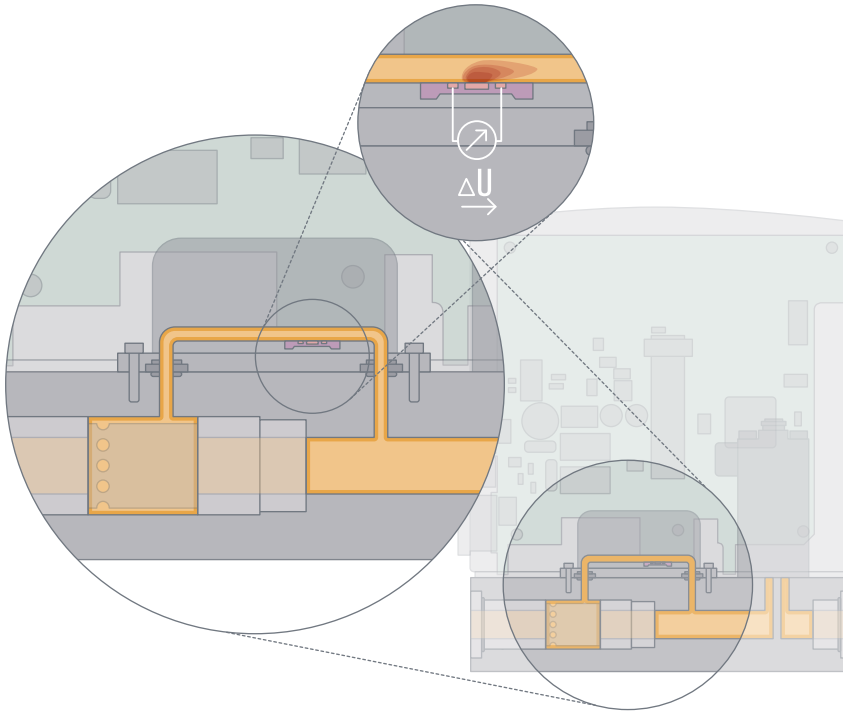
Phase out

7. Product operation

7.1. 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.



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](#)

8.4. Ordering chart accessories

Overview of accessories

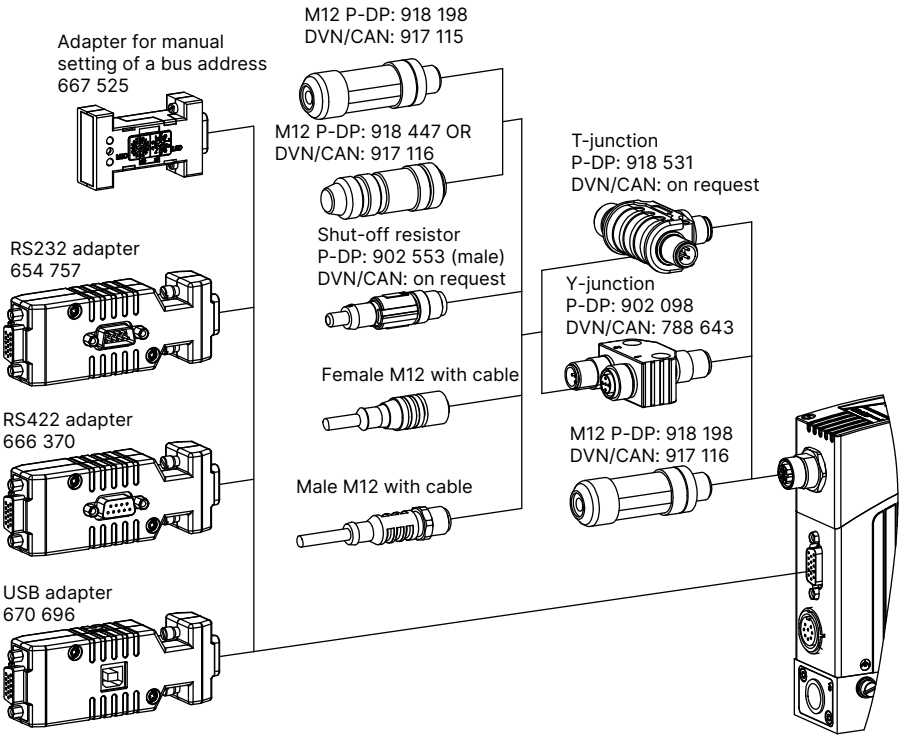
Note:

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

Description	Article no.
Connections/Cables	
M16 circular plug, 8-pin, soldered connection	918299
M16 circular plug with cable, 8-pin, cable length: 5 m, assembled on one side	787733
M16 circular plug with cable, 8-pin, cable length: 10 m, assembled on one side	787734
D-Sub HD15 plug with cable, 15-pin, cable length: 5 m, assembled on one side	787735
D-Sub HD15 plug with cable, 15-pin, cable length: 10 m, assembled on one side	787736
Adapters	
RS232 adapter (for connecting a PC in combination with an extension cable)	654757
Extension cable for RS232, M12 socket and/or M12 plug, 9-pin, cable length: 2 m	917039
USB adapter	670696
USB connection cable, cable length: 2 m	772299
Adapter for manual bus address setting (instead of via AF)	667525
Accessories for fieldbus	
PROFIBUS DP (B-coded)	
M12 plug, 5-pin, straight, B-coded ^{1.)}	918198
M12 socket (coupling), straight ^{1.)}	918447
Y-distributor ^{1.)}	902098
PROFIBUS T-distributor	918531
PROFIBUS terminating resistor, M12 plug, B-coded	902553
GSD file (PROFIBUS), EDS file (CANopen)	LINK ▶
CANopen (A-coded)	
M12 plug, 5-pin, straight ^{1.)}	917115
M12 circular socket with plastic threaded clamping ring, 5-pin, straight, to be wired ^{1.)}	917116
Y push-in connector, M12, 5-pin, CUM ^{1.)}	788643
T-distributor	On request
Termination resistor	On request
GSD file (PROFIBUS), EDS file (CANopen)	LINK ▶

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.

Adapter sketch



Phase out