burkert
FLUID CONTROL SYSTEMS

# Mass Flow Controller (MFC) for Gases

- Inline MFC for full scale rates from 20 $l_N$/min to 1500 $l_N$/min; 1/4" to 3/4"
- High accuracy
- Short settling time
- Optional fieldbus

Type 8626 can be combined with…

**Type 8619**
Multichannel program controller

**Type 0330**
3/2-way valve

**Type 6013**
2/2-way valve

The Type 8626 mass flow controller forms an integrated system, consisting of the flow sensor, control electronics and control valve. Using this controller, mass flows of gases can be kept constant or can follow a predefined set-point profile regardless of interfering influences (such as pressure or temperature variations). The sensor works according to the thermal principle (constant-temperature anemometer). The measurement is made in the main channel and provides the mass flow directly without any corrections (see description on page 2). The digital flow controller compares the set point with the actual value and calculates the control signal for the proportional valve. The direct-acting solenoid control valve works according to the well-tried plunger-type principle, and is driven by a PWM voltage signal. Besides its control function an intelligent algorithm ensures that the valve closes tight with 0% set point. The measurement in the main flow of the MFC Type 8626 is characterized by an excellent dynamics and a low sensitivity to contamination. The MFC can be used in versatile flow control tasks.

- Process technology
- Heat treatment
- Environmental technology
- Material coating
- Burner controls
- Fuel cell technology

| Technical Data | |
|---|---|
| **Nominal flow range** [1] ($Q_{nom}$) | 20 to 1500 $l_N$/min[2], $N_2$ equivalent<br>see table on page 2, higher flows on request |
| **Turn-down ratio** | 1:50 [3] |
| **Operating gas** | Neutral, non-contaminated gases, others available on request |
| **Calibration gas** | Operating gas or air with correcting function |
| **Max. operating pressure** (inlet pressure) | Up to max. 10 bar, depending on the orifice of the valve |
| **Gas temperature** | -10 to +70°C (-10 to +60°C with oxygen) |
| **Ambient temperature** | -10 to +45°C |
| **Accuracy** (after 15 min warm up time) | ±1.5% o.R. ±0.3% F.S.<br>(o.R.: of reading; F.S.: of full scale) |
| **Repeatability** | ±0.1% F.S. |
| **Settling time** ($t_{95\%}$) | <500 ms |
| **Materials** | |
| Body | Aluminium (black anodized) or stainless steel |
| Housing | Aluminium (coated) |
| Seals | FKM, EPDM |

| | |
|---|---|
| **Port connection** | G 1/4", 3/8", 1/2", 3/4", 1"<br>NPT 1/4", 3/8", 1/2", 3/4", 1" |
| **Control valve** | Normally closed |
| Valve orifice | 0.8 to 12 mm |
| $k_{Vs}$ value | 0.02 to 2.8 m³/h |
| **Electr. connection** | Socket M16, round, 8-pin and socket D-Sub HD15, 15-pin |
| Additionally with fieldbus: | With PROFIBUS-DP: Socket M12 5-pin or D-Sub 9-pin<br>With DeviceNet/CANopen: Plug M12 5-pin or D-Sub 9-pin |
| **Operating voltage** | 24V DC |
| **Voltage tolerance** | ±10% |
| **Residual ripple** | < 2% |
| **Power consumption** | 12,5 W–37 W (depending on version) |
| **Input signal** (set point) | 0–5V, 0–10V, 0–20 mA or 4–20 mA |
| **Input impedance** | >20 kΩ (voltage)<br><300 Ω (current) |
| **Output signal** (flow value) | 0–5 V, 0–10 V, 0–20 mA or 4–20 mA |
| **Max. current voltage output** | 10 mA |
| **Max. load current output** | 600 Ω |

[1] The nominal flow value is the max. flow value calibrated which can be controlled. 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] With vertical installation and flow downwards the turn-down ratio is 1:10

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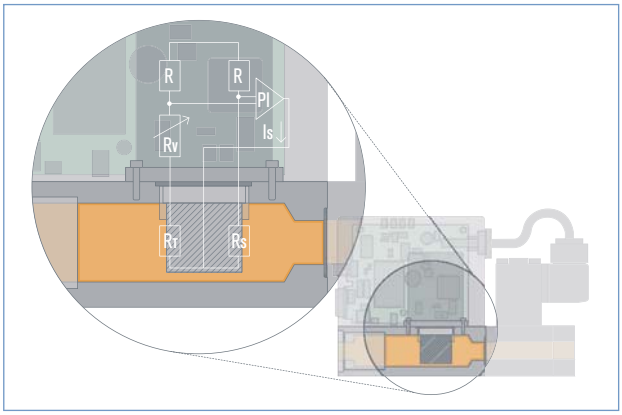
| Technical data (cont.) | |
|---|---|
| **Digital communication** via adapter possible: | RS232, Modbus RTU (via RS interface)<br>RS485, RS422 or USB<br>(see accessories table on p. 3) |
| **Fieldbus option** | PROFIBUS-DP, DeviceNet, CANopen<br>(D-Sub HD15 covered with sealed plate with fieldbus MFC) |
| **Type of protection** (with connected cables) | IP65 |
| **Dimensions** | See drawings on p. 6–9 |
| **Total weight** (examples) | 2,5 kg (Al, 16 W-valve)<br>4,5 kg (VA, 16 W-valve) |

| | |
|---|---|
| **Mounting position** | Horizontal or vertical |
| **Light emitting diodes** (Default, other functions programmable) | Indication for<br>1. Power, 3. Limit<br>2. Communication 4. Error |
| **Binary inputs** (Default, other functions programmable) | Three: 1. Start Autotune<br>2. not assigned<br>3. not assigned |
| **Binary outputs** (Default, other functions programmable) | Two relay outputs<br>1. Limit (desired value can not be achieved)<br>2. Error (e.g. sensor fault)<br>Load capacity: max. 60 V, 1 A, 60 VA |

## Measuring Principle




This sensor works as a hot-film anemometer in the so-called CTA operational mode (Constant Temperature Anemometer). To do this, two resistors with precisely specified temperature coefficients located directly in the media flow and three resistors located outside the flow are connected together to form a bridge.

The first resistor in the gas flow ($R_T$) measures the fluid temperature, while the second, low-value resistor ($R_S$) is heated so that it is maintained at a fixed, predefined over-temperature with respect to the fluid temperature. The heating current required to maintain this is a measure of the heat being removed by the flowing gas, and represents the primary measurement.

An adequate flow conditioning within the MFC and the calibration with high-quality flow standards ensure that the mass of gas flowing per time unit can be derived from the primary signal with high accuracy.

## Nominal Flow Ranges of Typical Gases

(other gases on request)

| Gas | Min. $Q_{nom}$ [$l_N$/min] | Max. $Q_{nom}$ [$l_N$/min] |
|---|---|---|
| **Acetylene** | 20 | 975 |
| **Ammonia** | 20 | 1250 |
| **Argon** | 20 | 1500 |
| **Carbon dioxide** | 20 | 800 |
| **Air** | 20 | 1500 |
| **Methane** | 20 | 750 |
| **Propane** | 20 | 400 |
| **Oxygen** | 20 | 1500 |
| **Nitrogen** | 20 | 1500 |

## Notes Regarding the Configuration

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 there are usually additional flow resistors (tubing, additional shut-off valves, nozzles etc.) present both before and after the controller.

Please use the specification sheet (p. 10) 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.

**Please use the form on page 10 for the information about your specific requirements.**

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## Ordering Chart for Accessories

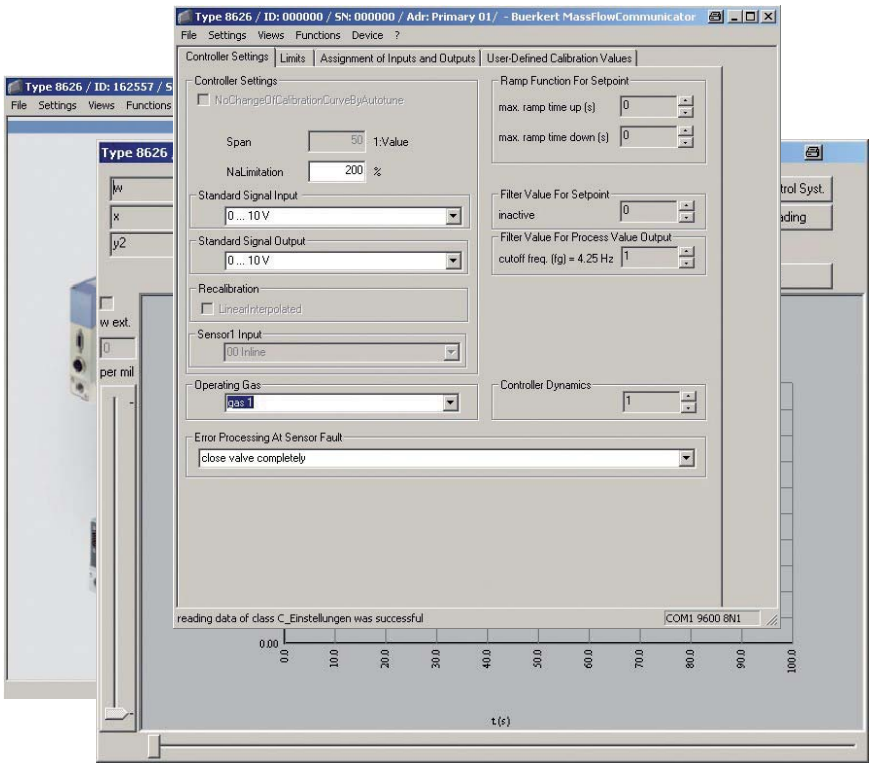
| Article | Item No. | |
|---|---|---|
| **Connectors/Cables** | | |
| Round plug M16 8-pin (solder connection) | 918 299 | |
| Round plug M16 8-pin with 5m cable | 787 733 | |
| Round plug M16 8-pin with 10m cable | 787 734 | |
| Plug D-Sub HD15 15-pin with 5m cable | 787 735 | |
| Plug D-Sub HD15 15-pin with 10m cable | 787 736 | |
| **Adapters** [4] | | |
| RS232 adapter for connection to a computer, connection with an extension cable (item no. 917039) | 654 757 | |
| Extension cable for RS232 9-pin socket/plug 2 m | 917 039 | |
| RS422-Adapter (RS485 compatible) | 666 370 | |
| USB-Adapter | 670 696 | |
| USB connection cable 2 m | 772 299 | |
| Adapter for manual bus adresse settings (instad of SW) | 667 525 | |
| Software MassFlowCommunicator | Download from www.buerkert.com | |
| **Accessories for Fieldbus** | **PROFIBUS DP (B-coded)** | **DeviceNet/ CANopen (A-coded)** |
| M12-Plug [5] | 918 198 | 917 115 |
| M12-socket (coupling) [5] | 918 447 | 917 116 |
| Y-junction [5] | 902 098 | 788 643 |
| T-junction | 918 531 | (on request) |
| Shut-off resistor | 902 553 | (on request) |
| GSD-File (PROFIBUS), EDS-File (DeviceNet, CANopen) | Download from www.buerkert.com (see Type 8626) | |

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

[5] The two M12 connectors as listed above cannot be used together on the same side of the Y-junction. At least one of the two M12 connection needs to be a prefabricated cable which uses typicly a thinner connector.

## Software MassFlowCommunicator for Communication with Bürkert MFC/ MFM

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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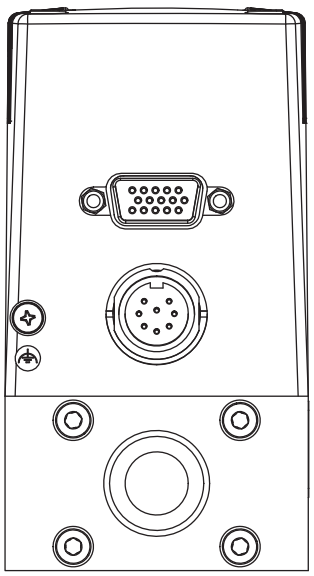
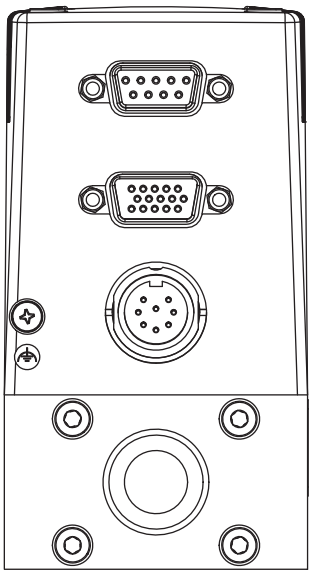
## Pin Assignment

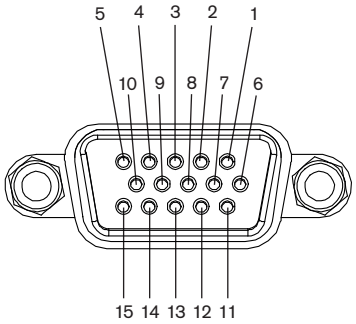


Standard



Fieldbus D-SUB

**Socket D-Sub HD15**

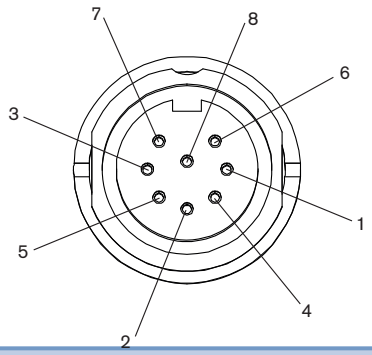



| Pin | Assignment | |
|---|---|---|
| | **Analogue Control** | **Bus control** |
| 1 | Set value input + | N.C. [6] |
| 2 | Set value input GND | N.C. |
| 3 | Actual value output + | N.C. |
| 4 | Binary input 2 | |
| 5 | 12V-Output (only for internal company use) | |
| 6 | RS232 TxD (direct connection to computer) | |
| 7 | Binary input 1 | |
| 8 | GND (for binary inputs) | |
| 9 | only company internal use (do not connect!) | |
| 10 | 12V-Output (only for internal company use) | |
| 11 | 12V-Output (only for internal company use) | |
| 12 | Binary input 3 | |
| 13 | Actual value output GND | N.C. |
| 14 | RS232 RxD direct connection to computer) | |
| 15 | DGND (for RS232-interface) | |

[6] N.C.: not connected (not used)

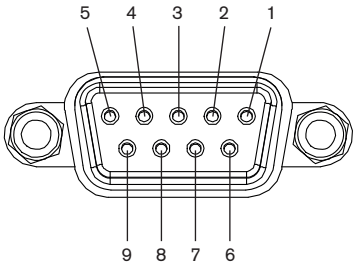
Note:
- Optional Pin 1 and 2 with bus version as transmitter input possible
- The cable length for RS232/ Setpoint and flow value signal is limited to 30 meters.

**Socket M16, round, 8-pin**




| Pin | Assignment |
|---|---|
| 1 | 24V-Supply + |
| 2 | Relay 1 – reference contact |
| 3 | Relay 2 – reference contact |
| 4 | Relay 1 – normally closed |
| 5 | Relay 1 – normally opened |
| 6 | 24V-Supply GND |
| 7 | Relay 2 – normally opened |
| 8 | Relay 2 – normally closed |

**Socket D-Sub 9-pin**
(only with fieldbus version)




| Pin | Assignment | |
|---|---|---|
| | **PROFIBUS DP** | **DeviceNet/ CANopen** |
| 1 | Shield | Shield |
| 2 | N.C. | CAN-L data line |
| 3 | RxD/TxD - P (B-line) | GND |
| 4 | RTS (control signal for repeater) | N.C. |
| 5 | GND | N.C. |
| 6 | VDD (only for termination resistor) | N.C. |
| 7 | N.C. | CAN-H data line |
| 8 | RxD/TxD - N (A-line) | N.C. |
| 9 | N.C. | N.C. |

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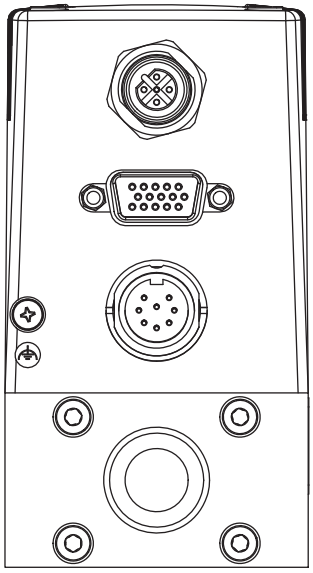
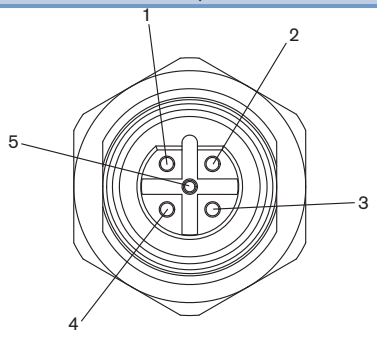
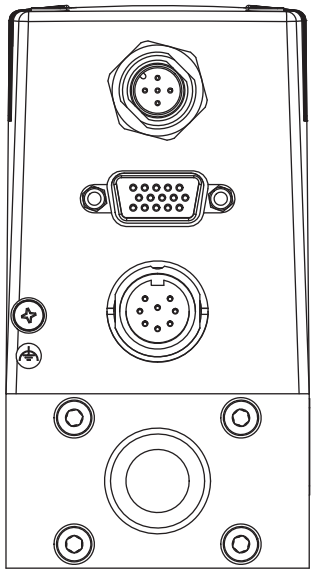
## Pin Assignment *(continued)*



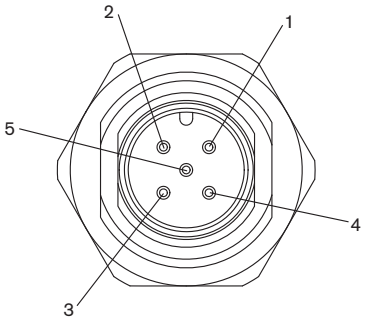
M12 Profibus

| PROFIBUS DP – socket B-coded M12 (DPV1 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 | N.C. |





M12 DeviceNet

| DeviceNet/ CANopen – Plug A-coded M12 | Pin | Assignment |
|---|---|---|
|  | 1 | Shield |
| | 2 | N.C. [7)] |
| | 3 | DGND |
| | 4 | CAN_H |
| | 5 | CAN_L |



[7)] Optional configuration with 24V DC possible for power supply via fieldbus connector. With this no power supply connection on round M16 plug needed.

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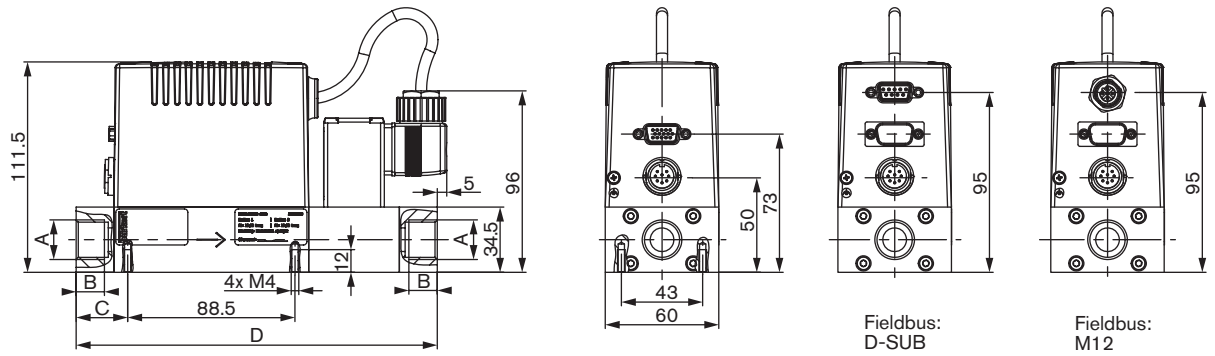
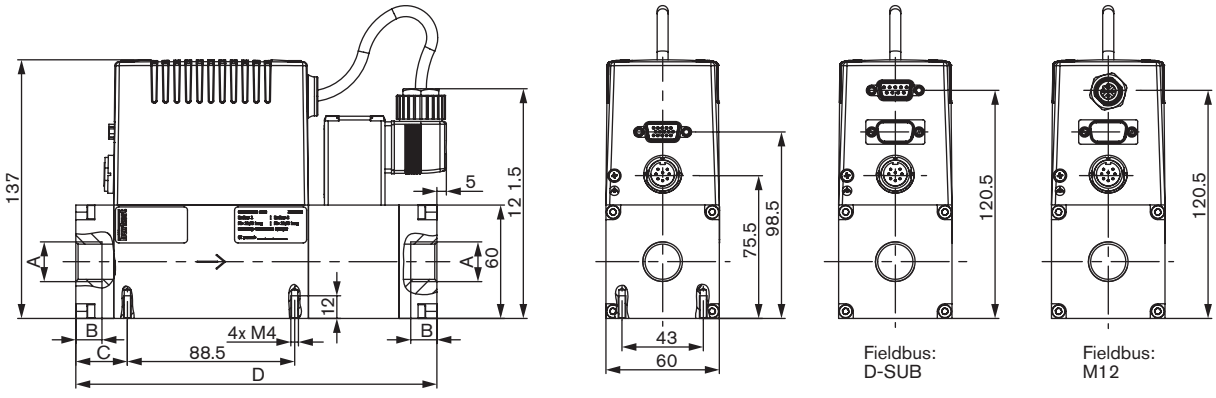
## Dimensions [mm]

### MFC 8626 with valve type 2833 (9W coil)




| A | B | C | D |
|---|---|---|---|
| G 1/4; NPT 1/4 | 10 | 22.25 | 181 |
| G 3/8; NPT 3/8 | 11 | 22.25 | 181 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 191 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 191 |

### MFC 8626 with valve type 2833 (9W coil) and base block for large nominal flow rates




| A | B | C | D |
|---|---|---|---|
| G 3/8; NPT 3/8 | 12 | 27.25 | 191 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 191 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 191 |

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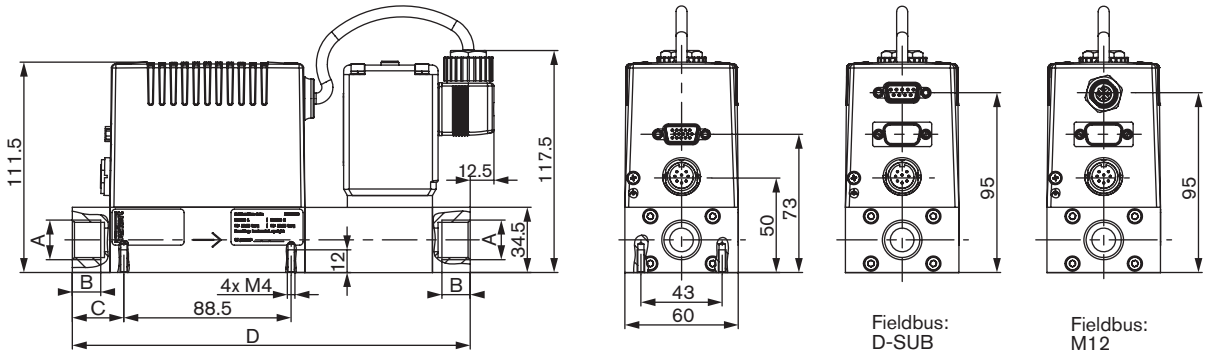
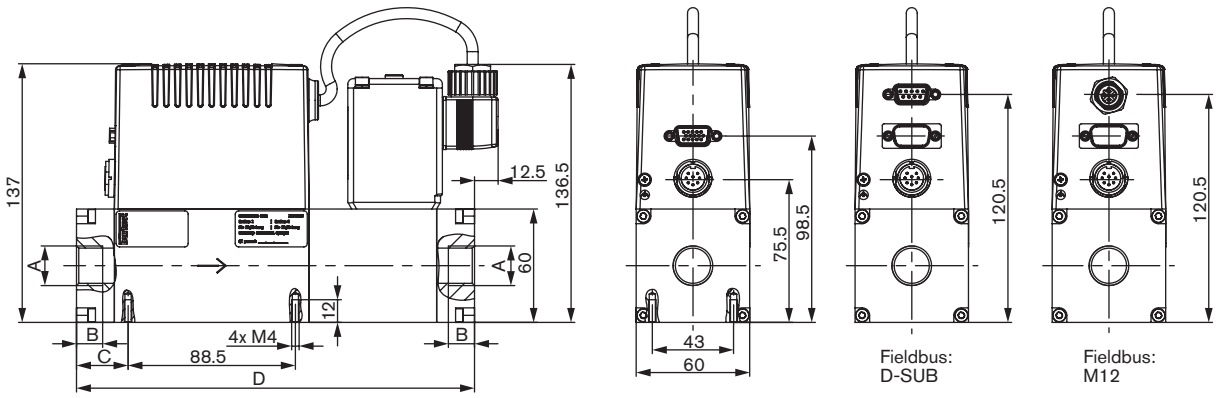
## Dimensions [mm]

### MFC 8626 with valve type 2835 (16W coil)




| A | B | C | D |
|---|---|---|---|
| G 1/4; NPT 1/4 | 10 | 22.25 | 200.5 |
| G 3/8; NPT 3/8 | 11 | 22.25 | 200.5 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 210.5 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 210.5 |

### MFC 8626 with valve type 2835 (16W coil) and base block for large nominal flow rates




| A | B | C | D |
|---|---|---|---|
| G 3/8; NPT 3/8 | 12 | 27.25 | 210.5 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 210.5 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 210.5 |

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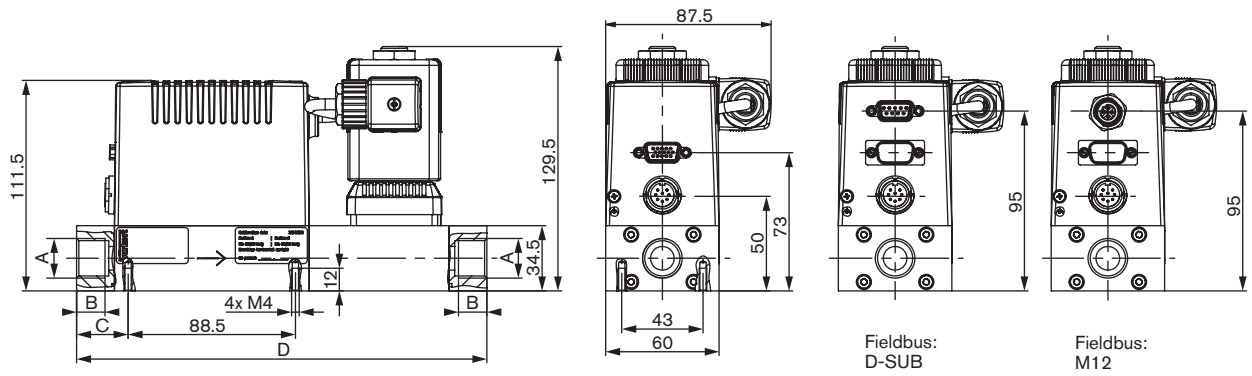
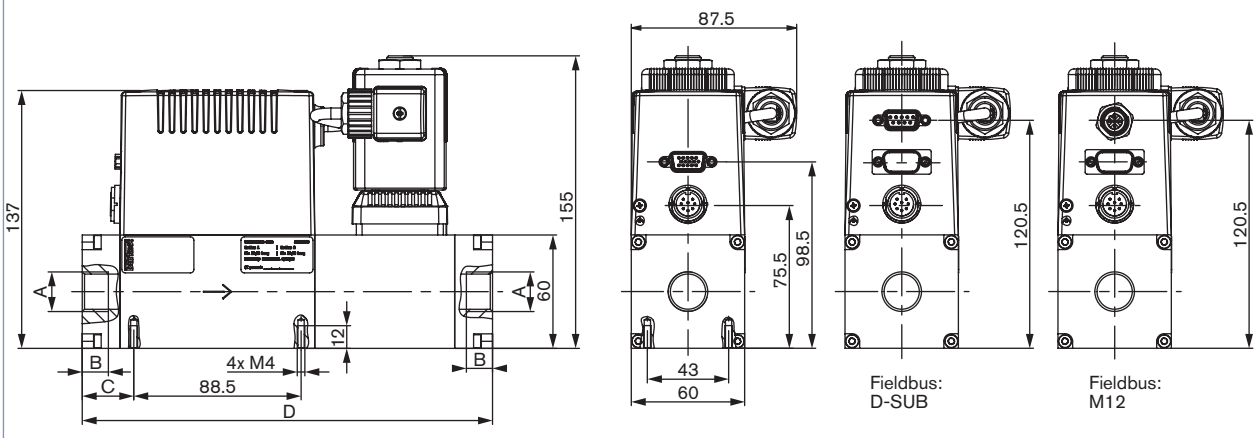
## Dimensions [mm]

### MFC 8626 with valve type 6024 (18W coil)




| A | B | C | D |
|---|---|---|---|
| G 1/4; NPT 1/4 | 10 | 22.25 | 207 |
| G 3/8; NPT 3/8 | 11 | 22.25 | 207 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 217 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 217 |

### MFC 8626 with valve type 6024 (18W coil) and base block for large nominal flow rates




| A | B | C | D |
|---|---|---|---|
| G 3/8; NPT 3/8 | 12 | 27.25 | 217 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 217 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 217 |

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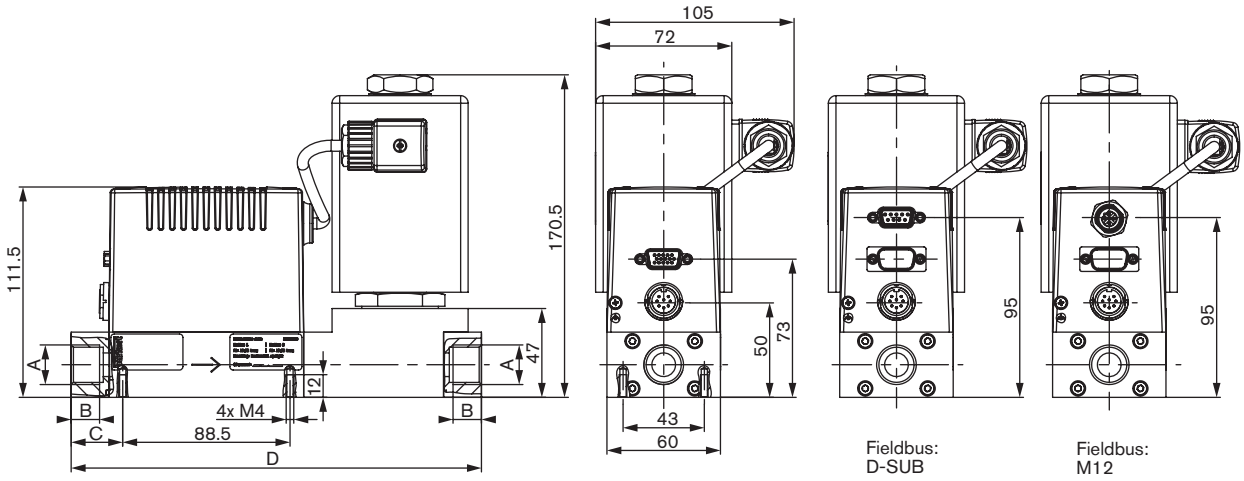
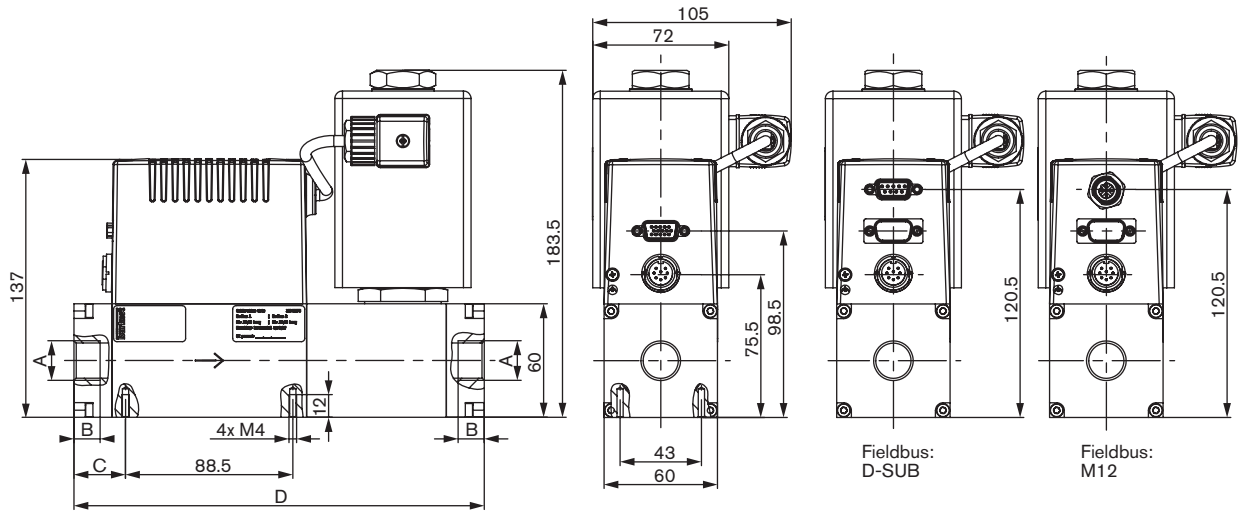
## Dimensions [mm]

### MFC 8626 with valve type 2836 (24W coil)




| A | B | C | D |
|---|---|---|---|
| G 1/4; NPT 1/4 | 10 | 22.25 | 207 |
| G 3/8; NPT 3/8 | 11 | 22.25 | 207 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 217 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 217 |

### MFC 8626 with valve type 2836 (24W coil) and base block for large nominal flow rates




| A | B | C | D |
|---|---|---|---|
| G 3/8; NPT 3/8 | 12 | 27.25 | 217 |
| G 1/2; NPT 1/2 | 14 | 27.25 | 217 |
| G 3/4; NPT 3/4 | 15 | 27.25 | 217 |

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Note
You can fill out the fields directly in the PDF file before printing out the form.

# MFC/MFM Applications – Request for Quotation

**Please complete and send to your nearest Bürkert sales centre**

| | |
|---|---|
| Company | Contact person |
| Customer No | Department |
| Address | Tel./Fax |
| Postcode/Town | E-mail |

☐ **MFC-Application** ☐ **MFM-Application** ☐ **Quantity** ☐ **Required delivery date**

## Fluid data

**Type of gas (or gas proportion in mixtures)** ☐

**Density** ☐ kg/m³ 8)

**Gas temperature** ☐ °C ☐ °F

**Moisture content** ☐ g/m³

**Abrasive components/solid particles** ☐ no ☐ yes, as follows: ☐

## Fluidic data

**Flow range $Q_{nom}$** ☐ Min. ☐ $l_N$/min 8) ☐ $l_S$/min (slpm) 9)

☐ Max. ☐ $m_N^3$/h 8) ☐ kg/h

☐ $cm_N^3$/min 8) ☐ $cm_S^3$/min (sccm) 9)

☐ $l_N$/h 8) ☐ $l_S$/h 9)

**Inlet pressure at $Q_{nom}$** 10) **$p_1$=** ☐ bar(g) ■

**Outlet pressure at $Q_{nom}$** **$p_2$=** ☐ bar(g) ■

**Max. inlet pressure $p_{1max}$** ☐ bar(g) ■

**MFC/MFM port connection**

☐ without screw-in fitting

- ☐ 1/4" G-thread (DIN ISO 228/1) ☐ 1/4" NPT-thread (ANSI B1.2)
- ☐ 3/8" G-thread (DIN ISO 228/1) ☐ 3/8" NPT-thread (ANSI B1.2)
- ☐ 1/2" G-thread (DIN ISO 228/1) ☐ 1/2" NPT-thread (ANSI B1.2)
- ☐ 3/4" G-thread (DIN ISO 228/1) ☐ 3/4" NPT-thread (ANSI B1.2)

☐ with screw-in fitting

- ☐ mm Pipeline (external Ø)
- ☐ inch Pipeline (external Ø)

**Installation**

☐ horizontal, valve upright (standard) ☐ horizontal, valve on side

☐ vertical, flow upwards ☐ vertical, flow downwards

**Ambient temperature** ☐ °C

## Material data

**Body (base block)** ☐ Aluminium (anodised) ☐ Stainless steel

**Seal material** ☐ FKM ☐ EPDM

## Electrical data

**Signals for set point and actual value**

| Standard signal | | | | With fieldbus | |
|---|---|---|---|---|---|
| Setpoint | | Actual value | | | |
| ☐ 0-5 V | ☐ 0-20 mA | ☐ 0-5 V | ☐ 0-20 mA | ☐ PROFIBUS DP | ☐ D-Sub |
| ☐ 0-10 V | ☐ 4-20 mA | ☐ 0-10 V | ☐ 4-20 mA | ☐ DeviceNet | ☐ M12 |
| | | | | ☐ CANopen | |

■ Please quote all pressure values as overpressures with respect to atmospheric pressure [bar(ü)]

8) at: 1,013 bar(a) and 0°C 9) at: 1.013 bar (a) and 20°C 10) matches with calibration pressure

reset form

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In case of special application conditions, please consult for advice.



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