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bürkert
FLUID CONTROL SYSTEMS

Mass Flow Controller for Gases (MFC)



- Nominal flow ranges from 20 l_N/min up to 2500 l_N/min
- High accuracy and repeatability
- Short settling times
- Protection class IP65
- Optional: Fieldbus interface

Type 8626 can be combined with…



Type 8619
Multichannel program controller

Type 0330
3/2 way valve

Type 6013
2/2 way valve

The mass flow controller (MFC) type 8626 is suited for regulating the mass flow of high gas flows. The thermal inline 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 8626 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 8626 is especially designed for use in harsh environments due to a low sensitivity to contamination and the high protection class. The MFC fits for various applications, like e.g. burner controls, heat treatment, metallurgy, food and beverage industry, environmental technology, material coatings, fuel cell technology or test benches.

Technical Data	
Nominal flow range[1] (Q_{nom})	20…1500 l_N/min[2], N_2 equivalent 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 (higher temperatures on request)
Accuracy (after 15 min warm up time)	±1.5% o.R. ±0.3% F.S. (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

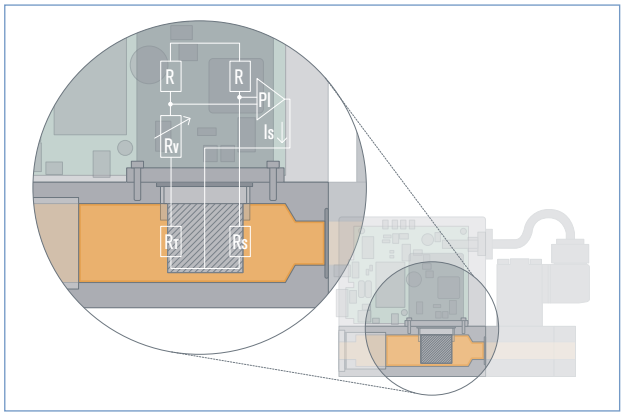
[1] The nominal flow value is the max. flow value calibrated which can be controlled. The nominal flow range defines the range of nominal flow rates (full scale values) possible.
[2] Index N: Flow rates referred to 1.013 bar and 0 °C.
Alternatively there is an Index S available which refers to 1.013 bar and 20 °C
[3] With vertical installation and flow downwards the turn-down ratio is 1:10

Port connection	G ¼", ⅜", ½", ¾", 1" NPT ¼", ⅜", ½", ¾", 1"
Control valve	Normally closed
Valve orifice	0.8…12 mm
k_{VS} value	0.02…2.8 m³/h
Electr. connection	Socket M16, round, 8 pin and socket D-Sub HD15, 15 pin
Additionally with:	
-PROFIBUS-DP:	Socket M12 5 pin or D-Sub 9 pin
-CANopen:	Plug M12 5 pin or D-Sub 9 pin
with RS485 version only:	Plug D-Sub 9 pin
Operating voltage	24 V DC
Voltage tolerance	±10%
Residual ripple	< 2%
Power consumption	12.5 W-37 W (depending on version)
Type of protection (with connected cables)	IP50 (RS485, RS422 versions) IP65
Dimensions	See drawings on p. 6-9
Total weight (examples)	2.5 kg (Al, 16 W-valve) 4.5 kg (VA, 16 W-valve)
Mounting position	Horizontal or vertical
Light emitting diodes (Default, other functions programmable)	Indication for 1. Power, 3. Limit 2. Communication 4. Error

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Technical Data *(cont.)*			
Device variant	**Analog signal version**	**Fieldbus version**	**RS485 version (only D-Sub, 9 pin)**
Analog communication Input signal (set point) Input impedance Output signal (actual flow) Max. current voltage output Max. load current output	 0 – 5 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA > 20 kΩ (voltage) < 300 Ω (current) 0 – 5 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA 10 mA 600 Ω	None	None
Fieldbus option (D-Sub HD15 covered with sealed plate for, pins for analogue inputs/outputs not connected)	None	PROFIBUS-DP, CANopen	Modbus RTU (via RS interface)
Digital communication via adapter possible:	RS232 (supports Modbus RTU) RS485, RS422 or USB		RS485, RS422 USB
Binary inputs (Default, other functions programmable)	Three: 1. Start Autotune 2. not assigned 3. not assigned		One: Start Autotune
Binary outputs (Default, other functions programmable)	Two relay outputs 1. Limit (desired value cannot be achieved) 2. Error (e.g. sensor fault) Load capacity: max. 60 V, 1 A, 60 VA		One relay output 1. Limit (desired value cannot be achieved) Load capacity: max. 25 V, 1 A, 25 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 $p_{1\ max}$ 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.

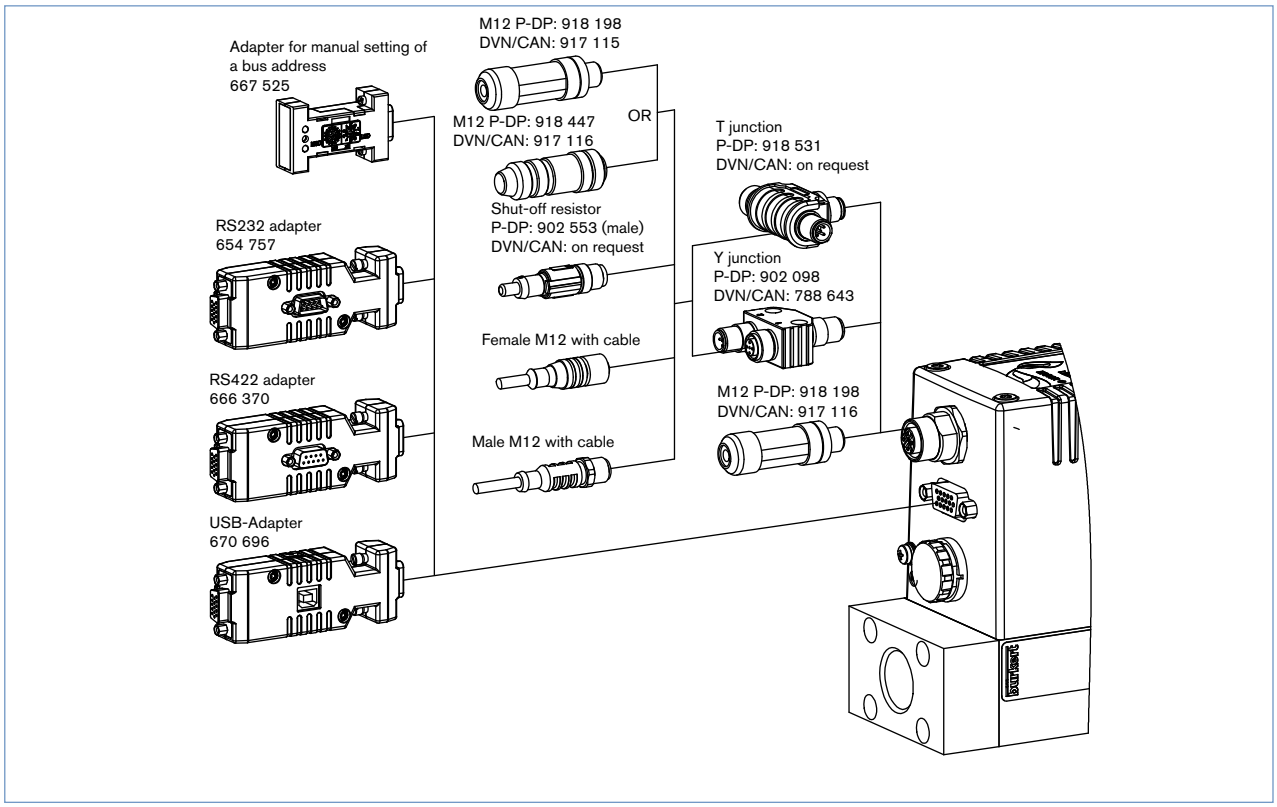
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Ordering Chart for Accessories

Article	Article no.	
Connectors/Cables		
Round plug M16 8 pin (solder connection)	918299	
Round plug M16 8 pin with 5 m cable	787733	
Round plug M16 8 pin with 10 m cable	787734	
Plug D-Sub HD15 15 pin with 5 m cable	787735	
Plug D-Sub HD15 15 pin with 10 m cable	787736	
Adapters[4]		
RS232 adapter for connection to a computer, connection with an extension cable (item no. 917 039)	654757	
Extension cable for RS232 9 pin socket/plug 2 m	917039	
RS422-Adapter (RS485 compatible)	666370	
USB-Adapter for D-Sub HD15	670696	
USB-Adapter for D-Sub 9 pin (RS485 Version)	670693	
USB connection cable 2 m	772299	
Adapter for manual bus adresse settings (instad of SW)	667525	
Software MassFlowCommunicator	Download from www.buerkert.com	
Accessories for Fieldbus	**PROFIBUS DP (B-coded)**	**CANopen (A-coded)**
M12-Plug[5]	918198	917115
M12-socket (coupling) [5]	918447	917116
Y-junction[5]	902098	788643
T-junction	918531	(on request)
Shut-off resistor	902553	(on request)
GSD-File (PROFIBUS), EDS-File (CANopen)	Download from www.buerkert.com (see Type 8626)	

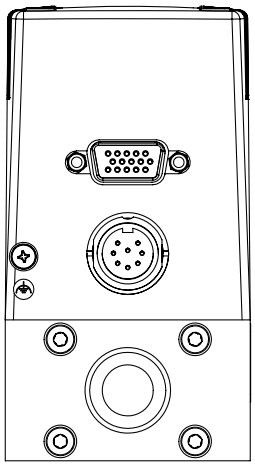
[4] The adapters serve mainly for initial operation or diagnosis. Those are not obligatory for continuous operation.

[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.

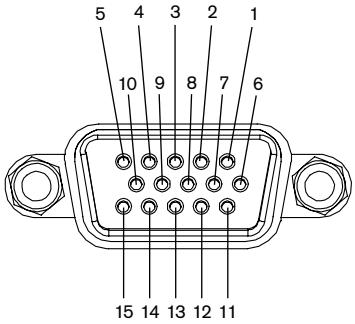


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Pin Assignment



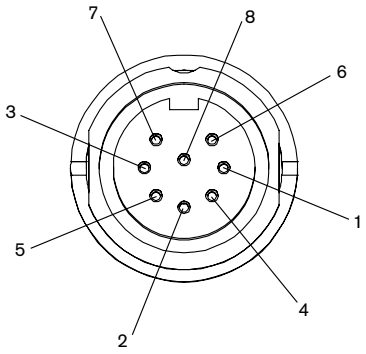
Standard

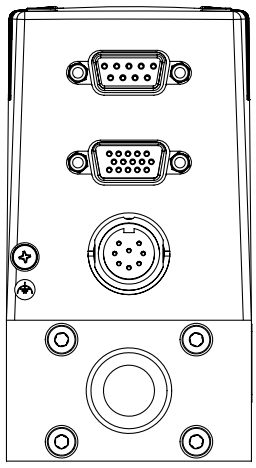
Socket D-Sub HD15	Pin	Assignment	
		Analogue Control	Bus control
	1	Set value input +	N.C. [6]
	2	Set value input GND	N.C.
	3	Actual value output +	N.C.
	4	Binary input 2	
	5	12 V-Output (only for internal company use)	
	6	RS232 TxD (direct connection to computer)	
	7	Binary input 1	
	8	GND (for binary inputs)	
	9	only company internal use (do not connect!)	
	10	12 V-Output (only for internal company use)	
	11	12 V-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)

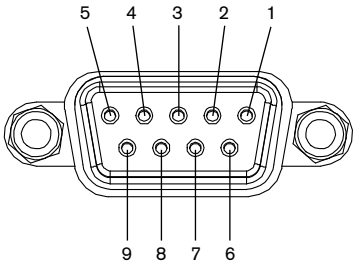
Note:

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

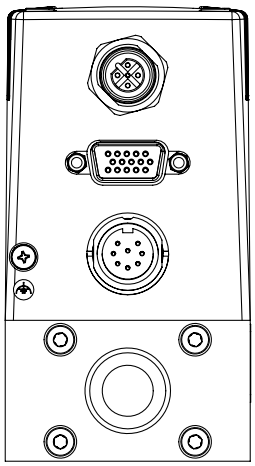


Fieldbus D-SUB

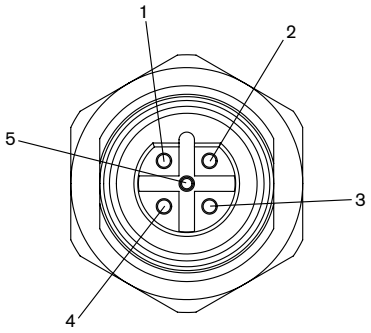
Socket D-Sub 9 pin (only with fieldbus version)	Pin	Assignment	
		PROFIBUS DP	CANopen
	1	Shield	Shield
	2	N.C.	CAN-L data line
	3	RxD/TxD - P (B-line)	GND
	4	RTS (control signal for repeater)	N.C.
	5	GND	N.C.
	6	VDD (only for termination resistor)	N.C.
	7	N.C.	CAN-H data line
	8	RxD/TxD - N (A-line)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

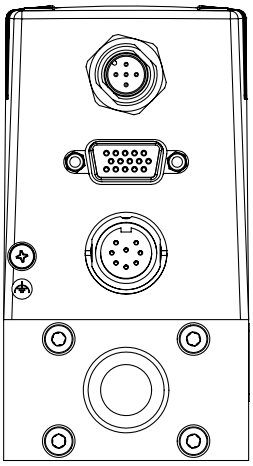
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Pin Assignment *(continued)*

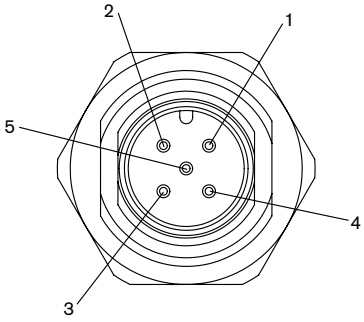


M12 Profibus

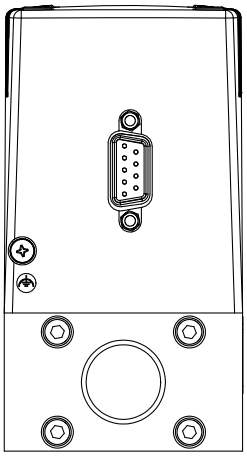
PROFIBUS DP – socket B-coded M12 (DPV1 max. 12 Mbaud)	Pin	Assignment
	1	VDD (only for termination resistor)
	2	RxD/TxD – N (A-line)
	3	DGND
	4	RxD/TxD – P (B-line)
	5	N.C.



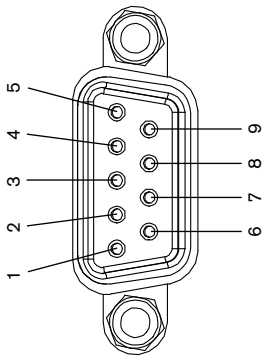
M12

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



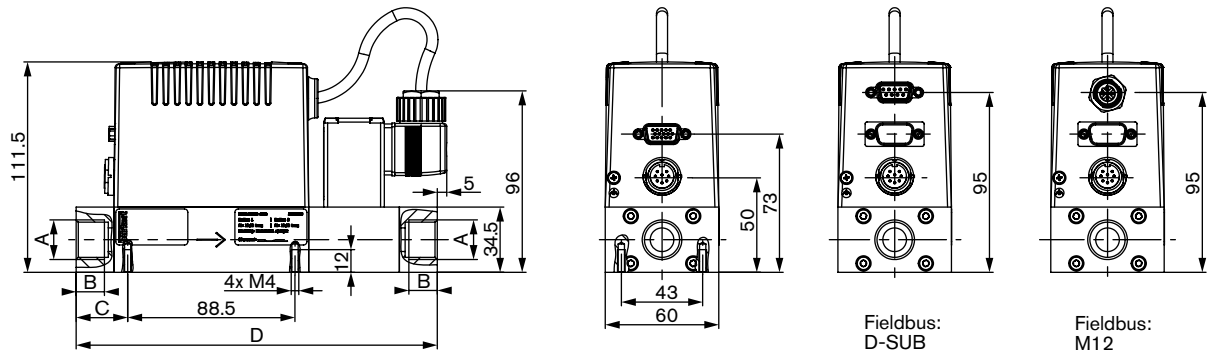
RS485 version

Plug D-Sub 9 pin	Pin	Assignment
	1	Binary input (related to GND pin 2)
	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)

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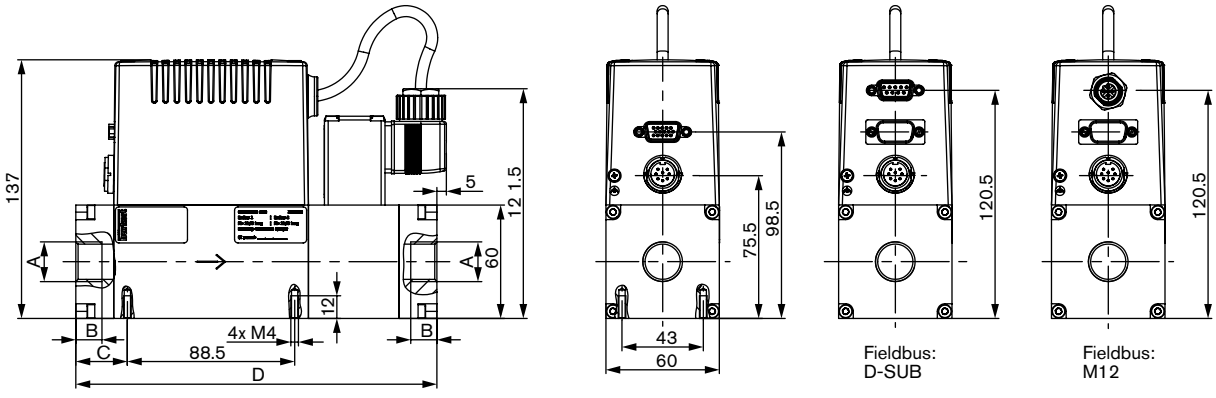
Dimensions [mm]

MFC 8626 with valve type 2873 (9 W coil)



A	B	C	D
G ¼; NPT ¼	10	22.25	181
G ⅜; NPT ⅜	11	22.25	181
G ½; NPT ½	14	27.25	191
G ¾; NPT ¾	15	27.25	191

MFC 8626 with valve type 2873 (9 W coil) and base block for large nominal flow rates

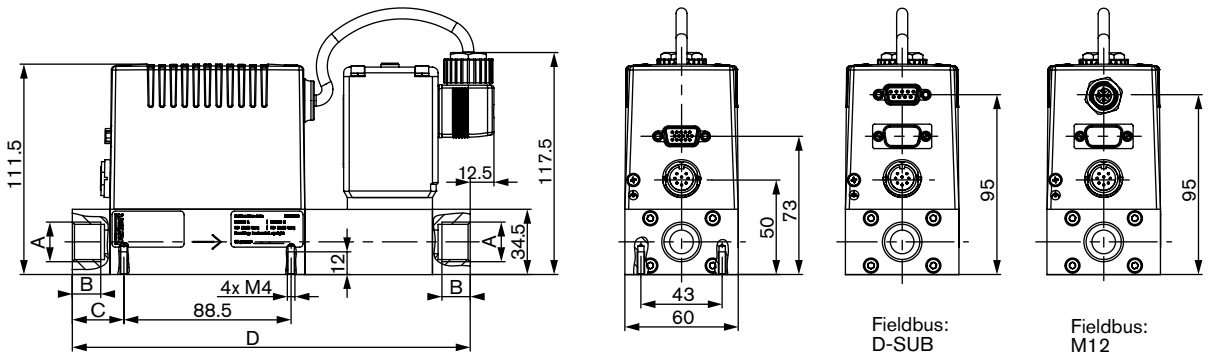


A	B	C	D
G ⅜; NPT ⅜	12	27.25	191
G ½; NPT ½	14	27.25	191
G ¾; NPT ¾	15	27.25	191
G 1	17	27.5	191

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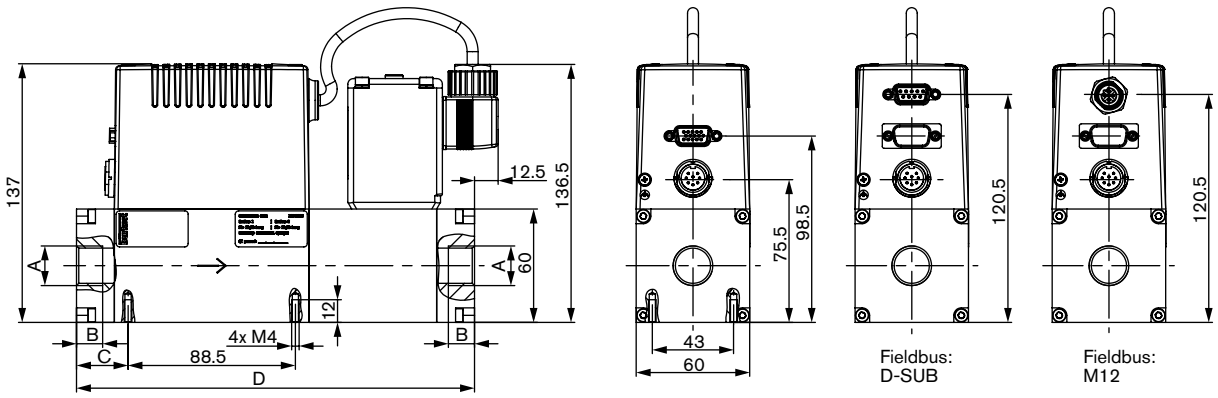
Dimensions [mm]

MFC 8626 with valve type 2875 (16 W coil)



A	B	C	D
G ¼; NPT ¼	10	22.25	200.5
G ⅜; NPT ⅜	11	22.25	200.5
G ½; NPT ½	14	27.25	210.5
G ¾; NPT ¾	15	27.25	210.5

MFC 8626 with valve type 2875 (16 W coil) and base block for large nominal flow rates

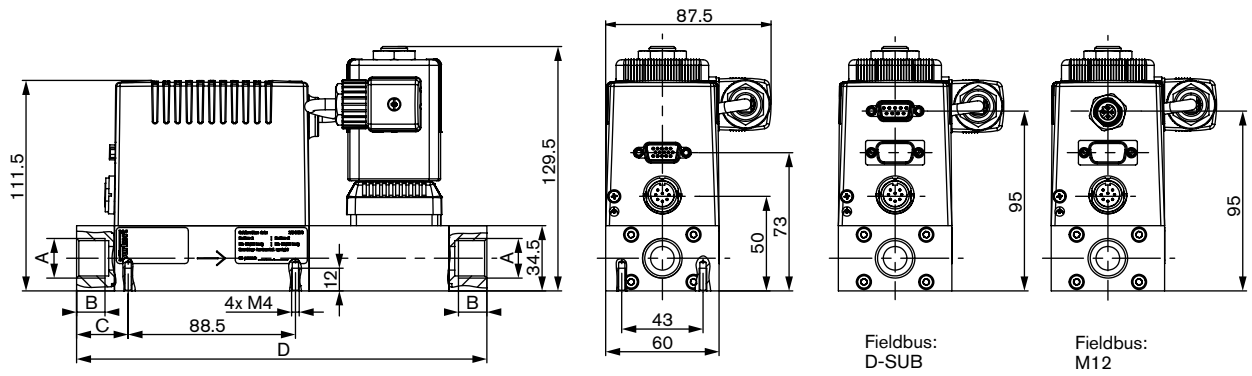


A	B	C	D
G ⅜; NPT ⅜	12	27.25	210.5
G ½; NPT ½	14	27.25	210.5
G ¾; NPT ¾	15	27.25	210.5
G 1	17	27.5	210.5

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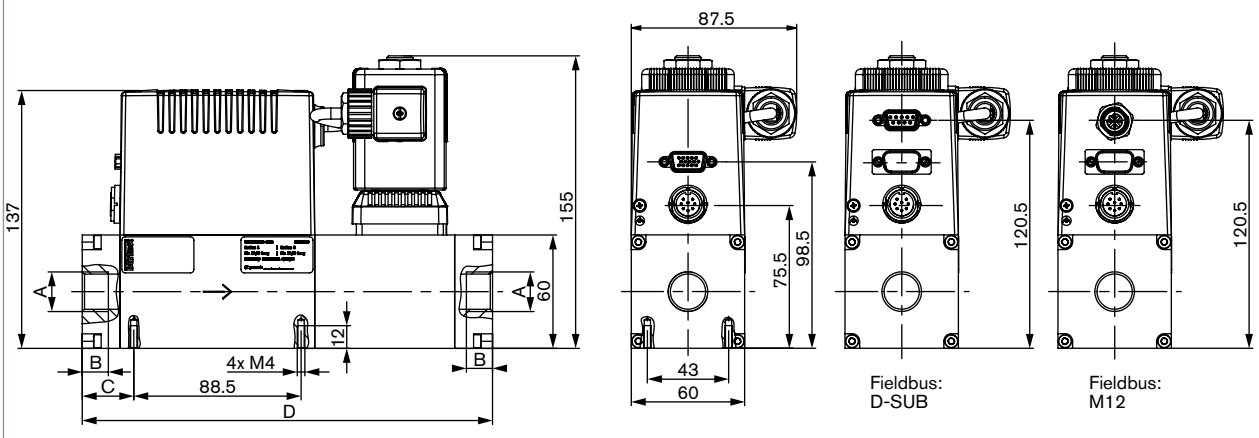
Dimensions [mm]

MFC 8626 with valve type 6024 (18 W coil)



A	B	C	D
G ¼; NPT ¼	10	22.25	207
G ⅜; NPT ⅜	11	22.25	207
G ½; NPT ½	14	27.25	217
G ¾; NPT ¾	15	27.25	217

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

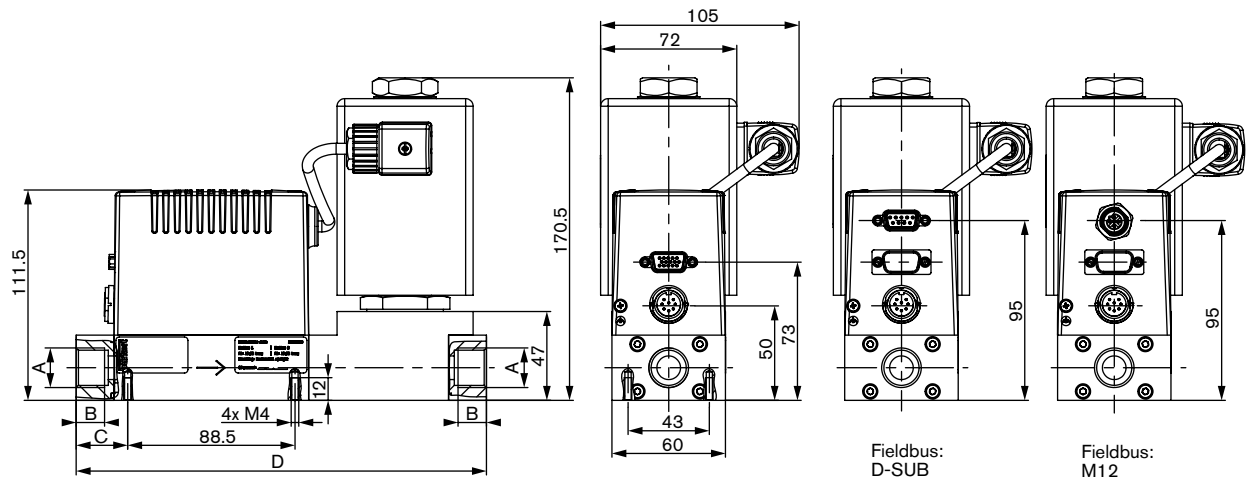


A	B	C	D
G ⅜; NPT ⅜	12	27.25	217
G ½; NPT ½	14	27.25	217
G ¾; NPT ¾	15	27.25	217
G 1	17	27.5	217

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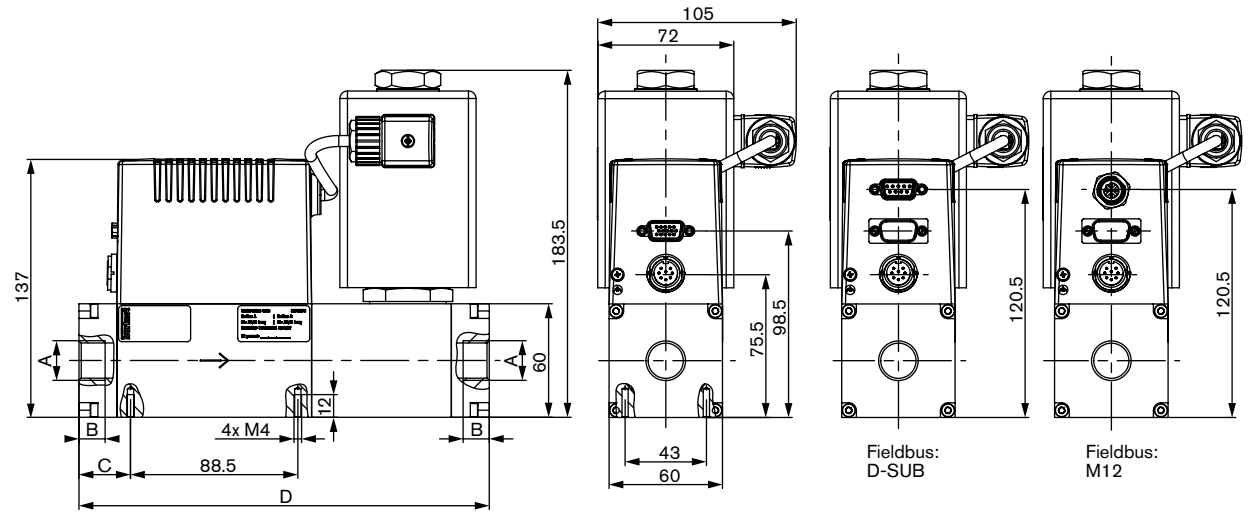
Dimensions [mm]

MFC 8626 with valve type 2836 (24 W coil)



A	B	C	D
G ¼; NPT ¼	10	22.25	207
G ⅜; NPT ⅜	11	22.25	207
G ½; NPT ½	14	27.25	217
G ¾; NPT ¾	15	27.25	217

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



A	B	C	D
G ⅜; NPT ⅜	12	27.25	217
G ½; NPT ½	14	27.25	217
G ¾; NPT ¾	15	27.25	217
G 1	17	27.5	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 $p_{1\ max}$ ☐ bar(g) ■

MFC/MFM port connection

☐ without screw-in fitting

- ☐ ¼" G-thread (DIN ISO 228/1) ☐ ¼" NPT-thread (ANSI B1.2)
- ☐ ⅜" G-thread (DIN ISO 228/1) ☐ ⅜" NPT-thread (ANSI B1.2)
- ☐ ½" G-thread (DIN ISO 228/1) ☐ ½" NPT-thread (ANSI B1.2)
- ☐ ¾" G-thread (DIN ISO 228/1) ☐ ¾" NPT-thread (ANSI B1.2)
- ☐ 1" G-thread (DIN ISO 228/1)

☐ 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** Setpoint / Actual value		**with fieldbus**		**with RS485**
	☐ 0 – 5 V ☐ 0 – 10 V	☐ 0 – 20 mA ☐ 4 – 20 mA	☐ PROFIBUS DP ☐ CANopen	☐ M12 ☐ D-Sub	☐ D-Sub

■ 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

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

Subject to alteration.
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