

## Mass Flow Controller (MFC) / Mass Flow Meter (MFM) for Gases



Type 8742 can be combined with...



**Type 6011**  
2/2- way  
Plunger valve



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



**Type 6027**  
2/2- way  
Plunger valve



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



**Type ME43**  
Fieldbus Gateway



**Type BUPLUS**

The mass flow controller / meter type 8742 for gases is intended for the use in a bus or CANopen network. The bus network technology is based on CAN physics and was developed by Bürkert especially for Industrial Ethernet or fieldbus communication in applications with multiple control loops. In combination with the system control unit (SCU) type ME2X, the CANopen based communication can be translated to the customer's fieldbus. The mass flow controller (MFC) / meter (MFM) can always be switched between bus and CANopen communication. Given that, Type 8742 can also be directly integrated into existing CANopen networks. Type 8742 can be configured as MFM or MFC. Optional, two different gases can be calibrated. The thermal MEMS sensor is located directly in the gas stream and therefore reaches very fast response times. A direct-acting proportional valve as regulating unit guarantees high sensitivity. The integrated PI controller ensures outstanding control characteristics of the MFC / MFM. Type 8742 is especially designed for use in harsh environments due to high protection class and explosion-proof.

- Nominal flow ranges from 0.010 l<sub>N</sub>/min to 160 l<sub>N</sub>/min
- High accuracy and repeatability
- Protection class IP65 and IP67
- Communication via fieldbus based on CANopen
- Optional: ATEX II Kat. 3G/D

Technical data	
<b>Nominal flow range</b> (Q <sub>nom</sub> )	10 ml <sub>N</sub> /min to 160 l <sub>N</sub> /min (N <sub>2</sub> )
<b>Turn-down ratio</b>	50:1, optional 100:1
<b>Operating medium</b>	Neutral, non-contaminated gases, (others on request)
<b>Calibration medium</b>	Operating gas or air
<b>Max. operating pressure</b>	10 bar (145 psi), with MFCs the max. pressure depends on the orifice of the valve
<b>Medium temperature</b>	-10 °C to +70 °C (-10 °C to +60 °C with oxygen)
<b>Ambient temperature</b>	-10 °C to +50 °C (higher temperatures on request)
<b>Accuracy</b>	±0.8 % o.R. ±0.3 % F.S. (after 1 min. warm up time)
<b>Repeatability</b>	±0.1 % F.S.
<b>Settling (MFC)/ response (MFM) time (t<sub>95%</sub>)</b>	<300 ms
<b>Materials</b> Body Housing Seals	Stainless steel or aluminium Aluminium die casting (coated) FKM or EPDM (depending on gas)
<b>Port connection</b>	NPT ¼, G ¼, screw-in fitting or subbase, others on request
<b>Control valve</b> (prop. valve) Valve orifice range k <sub>vs</sub> value range	normally closed 0.05...4 mm 0.00006...0.32 m³/h
<b>Electr. connection</b>	M12 plug, 5 pin
<b>Operating voltage</b>	2 V DC
<b>Voltage tolerance</b>	±10 %
<b>Power consumption<sup>1)</sup></b>	1 ... 3 W (as MFM), Max. 3...12 W (as MFC, depending on type of solenoid control valve)

<sup>1)</sup> Data refers to the typical power consumption (at 23 °C ambient temperature, nominal flow rate and 30 min. control mode). The specifications according to UL 61010-1 can differ (see instruction manual).

## Technical data, continued

Technical data, continued	
Residual ripple	±2 %
Digital Comm.	CANopen or CAN based bus
Removable memory	EEPROM (SIM card: bus relevant data and information about spec. control loop in order to ease replacement)
Input-/ Output signals	none, communication via bus
Protection class	IP65 and IP67
ATEX compliance	II 3G Ex nA IIC T* Gc X and II 3D Ex tc IIIC T***C Dc X1
Dimensions	See drawings on pages 4...6
Total weight	ca. 950 g (stainless steel body)
Installation	Horizontal or vertical
Device status	RGB-LED based on NAMUR NE107

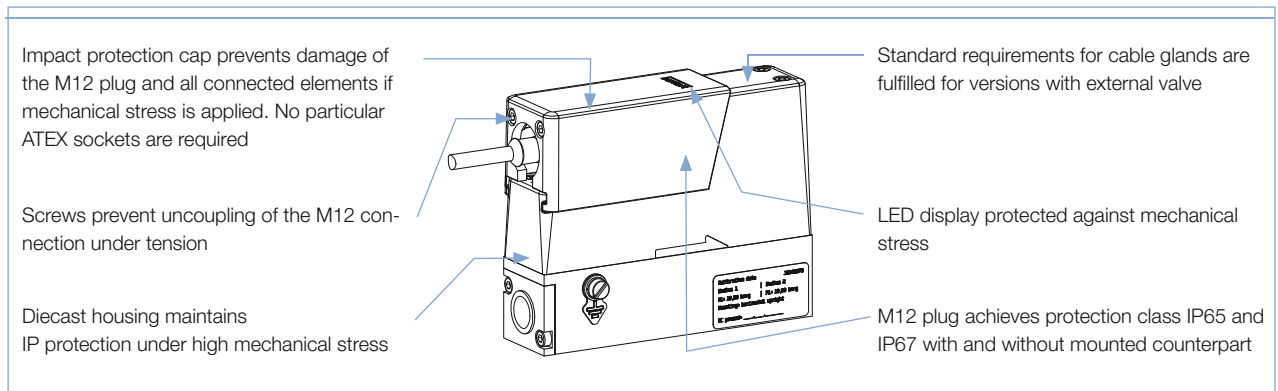
## Nom. flow ranges of typical gases

Nom. flow ranges of typ. Gases <sup>3)</sup>		
Gas	Min. Q <sub>nom</sub> [l <sub>N</sub> /min]	Max. Q <sub>nom</sub> [l <sub>N</sub> /min]
Argon	0.01	160
Helium	0.01	1000
Carbon dioxide	0.02	80
Air	0.01	160
Methane	0.01	160
Oxygen	0.01	160
Nitrogen	0.01	160
Hydrogen	0.01	1000
Propane	0.03	44

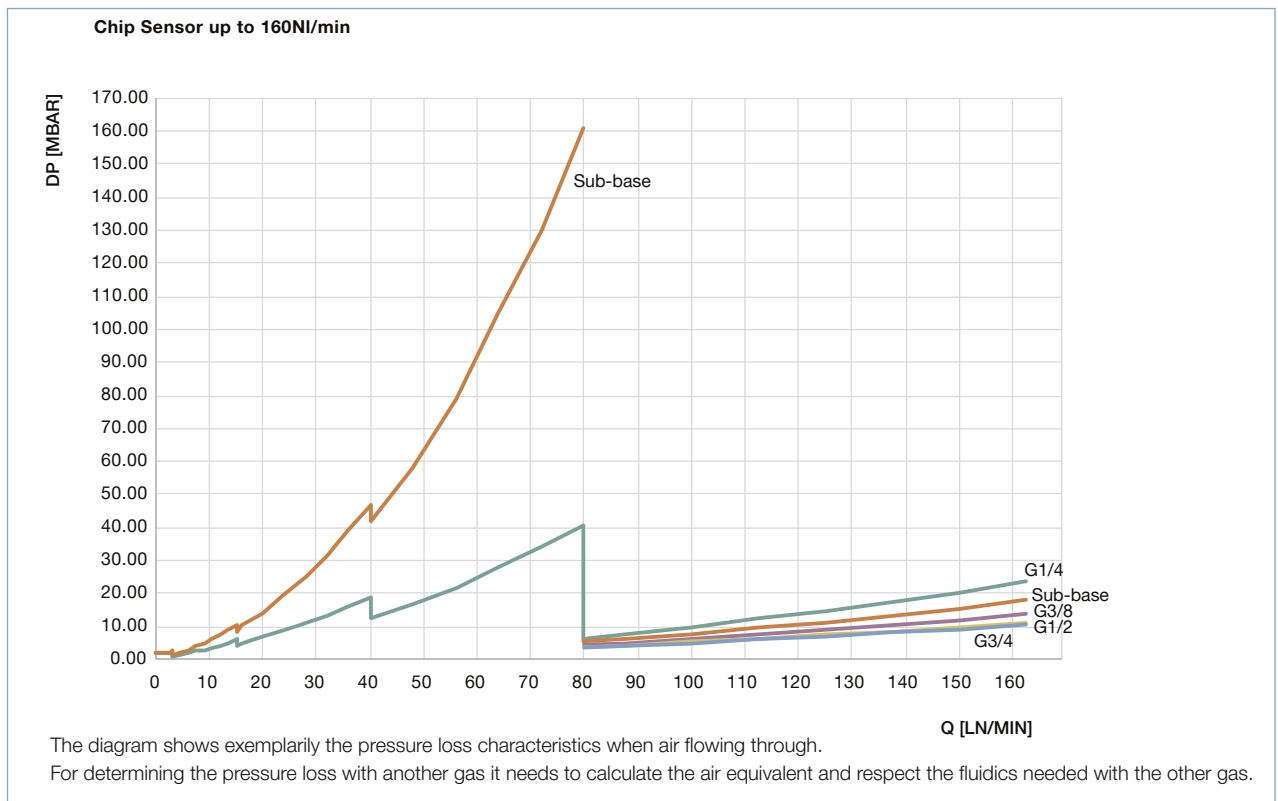
<sup>3)</sup> All values refer to 1.013 bara and 0 °C (Index N)

## Features to fulfill the ATEX requirements

Devices with ATEX conformity meet protection class IP65



## Pressure Loss Diagram of a MFM (ref. to air, with 25µm inlet filter)



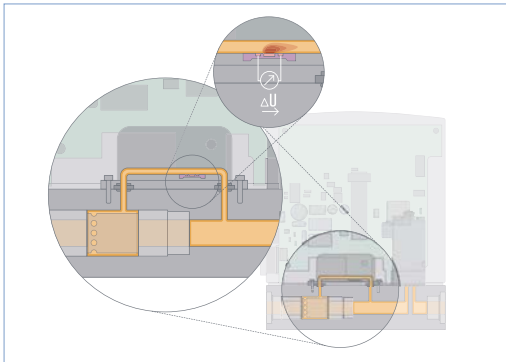
## Notes Regarding the Configuration

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

Please use the request for quotation form on p. 8 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.

► The request form on page 8 contains the relevant fluid specification. Using the experience of Bürkert engineers already in the design phase provide us with a copy of the request containing the necessary data together with your inquiry or order.

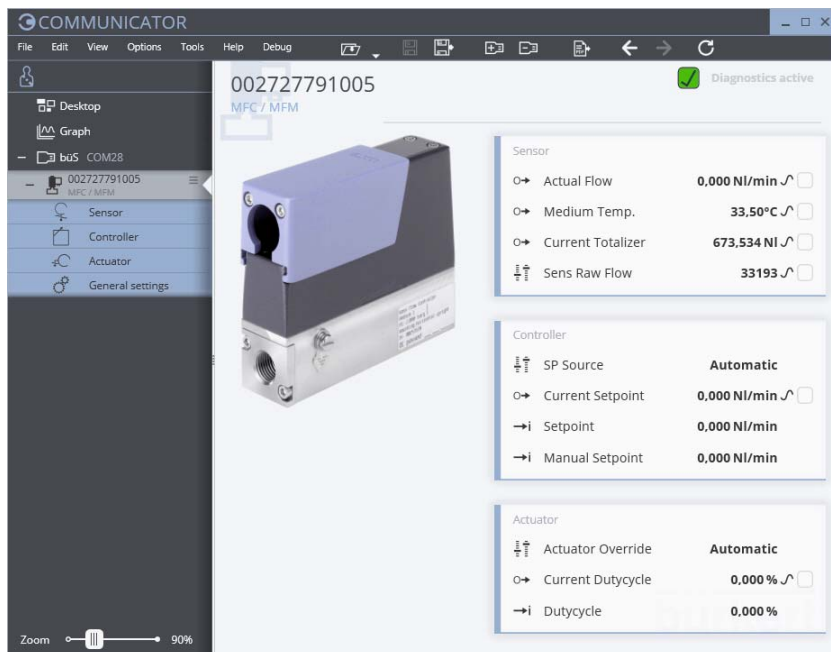
## Measuring Principle



The actual flow rate is detected by a sensor. This 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.

## Software Bürkert Communicator



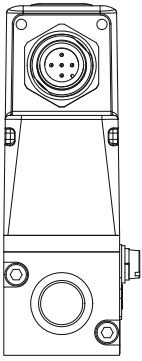
Part of Bürkert's new EDIP program (Efficient Device Integration Platform) is the Bürkert Communicator. This software can be run under MS-Windows and it is available on Bürkert's website for free. The Bürkert Communicator allows convenient system configuration and parameterisation of all connected field devices. An accessory part, the bUS stick – please see ordering chart for accessories – serves as the interface between computer and process instruments. It transfers "USB data" to "CAN data". The Communicator allows:

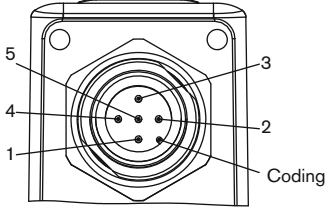
- Diagnosis - Parameterization - Registration and storage of process data. The Communicator allows:
- Diagnosis
- Parameterization
- Registration and storage of process data
- Data logging
- To watch graph of process
- To update firmware of the bUS device connected
- To program system controls by User-f(x) – e.g. gas blending
- guided re-calibration
- ...

To install the software, click on the download button.

[Download](#)

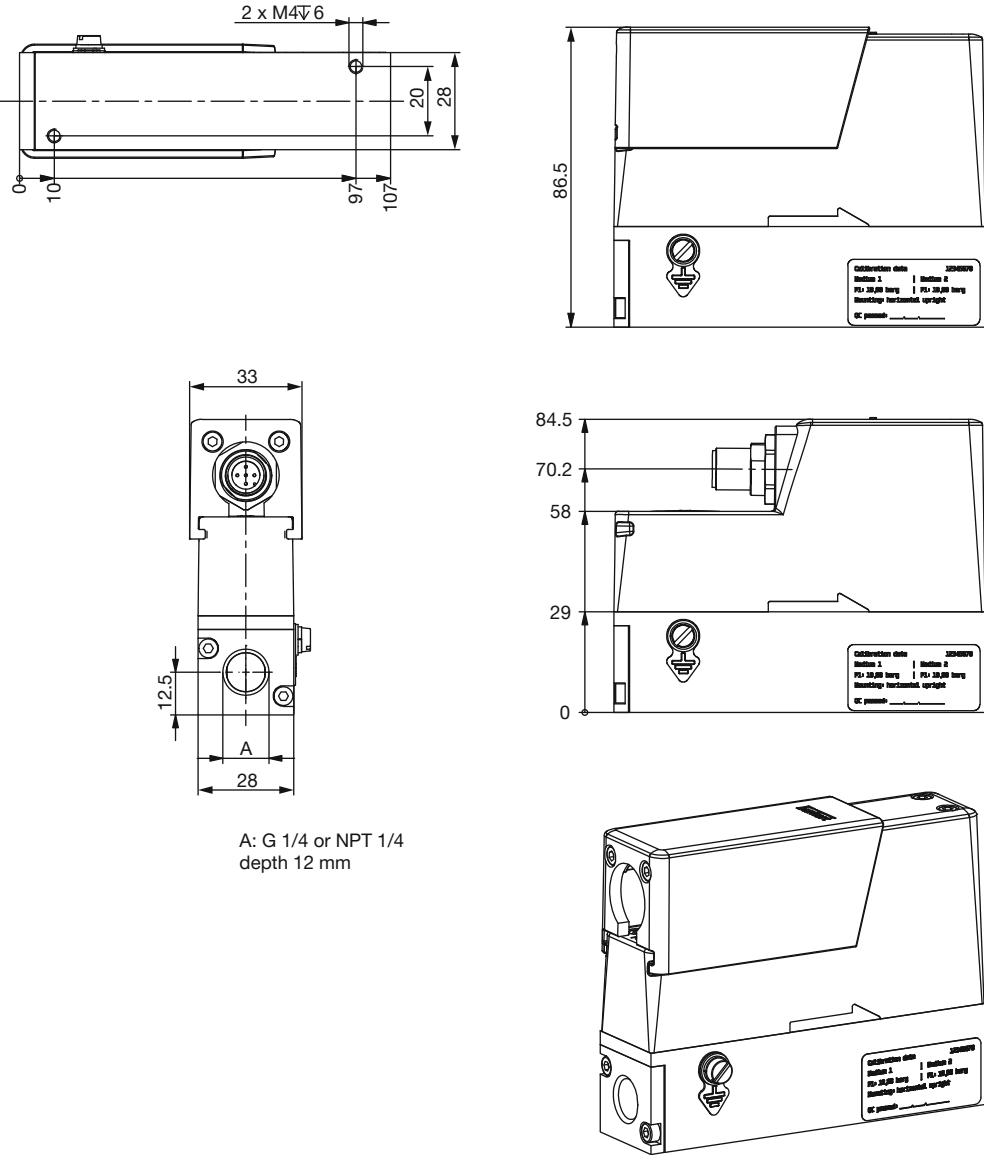
Pin Configuration



M12 Plug, 5 pin (A-coded)	Pin	Configuration
	1	SHIELD
	2	V+
	3	DGND
	4	CAN_H
	5	CAN_L

Dimensions [mm]

Type 8742 büS / CANopen: MFM or MFC version with internal valve (Type 2871)



2 x M4 $\Psi$ 6

0 10 97 107 20 28

86.5

33

12.5

A

28

84.5

70.2

58

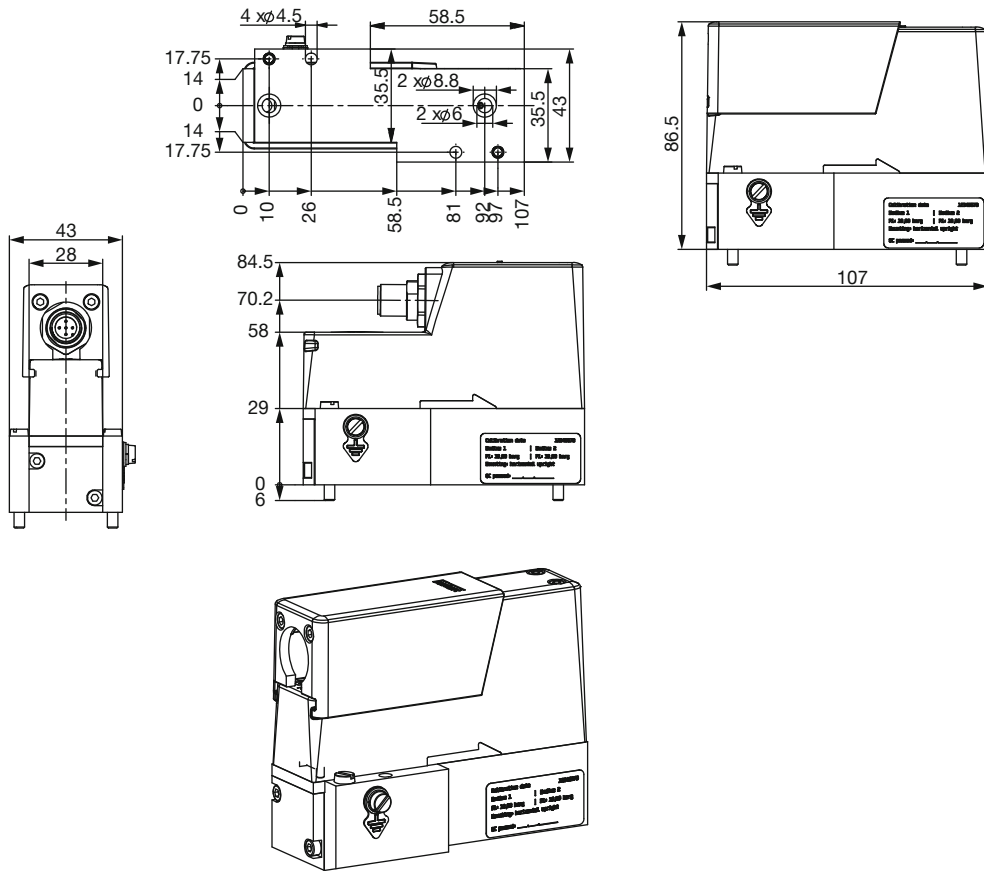
29

0

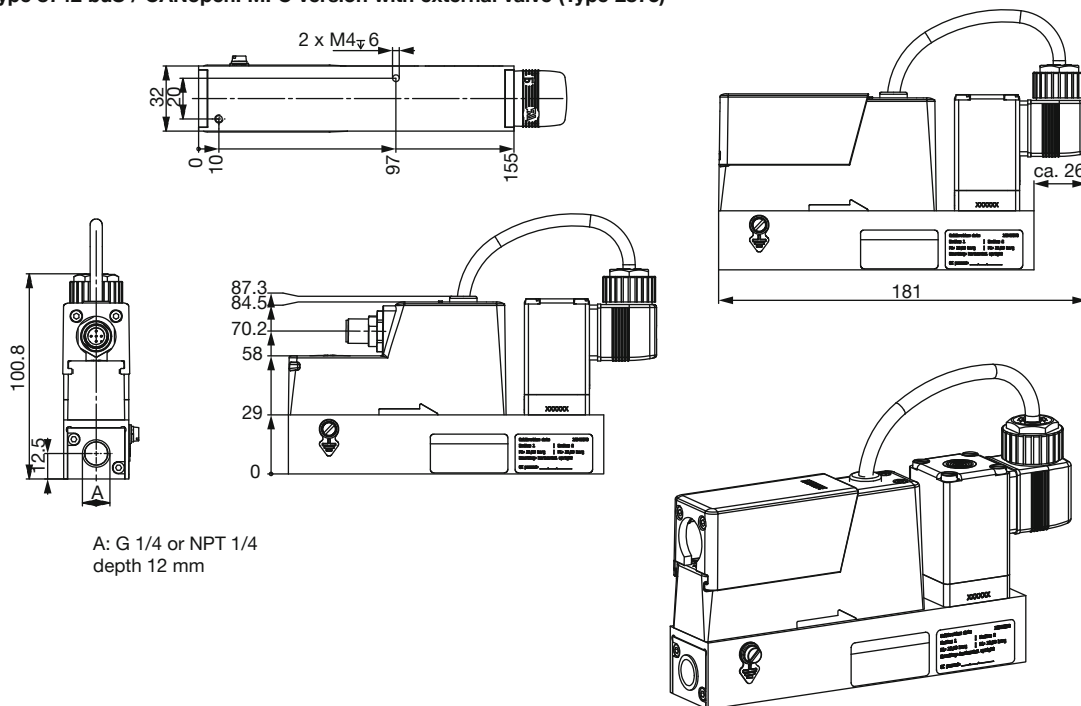
A: G 1/4 or NPT 1/4  
depth 12 mm

Dimensions [mm]

Type 8742 büS / CANopen: MFM or MFC version with internal valve (Type 2871) subbase version

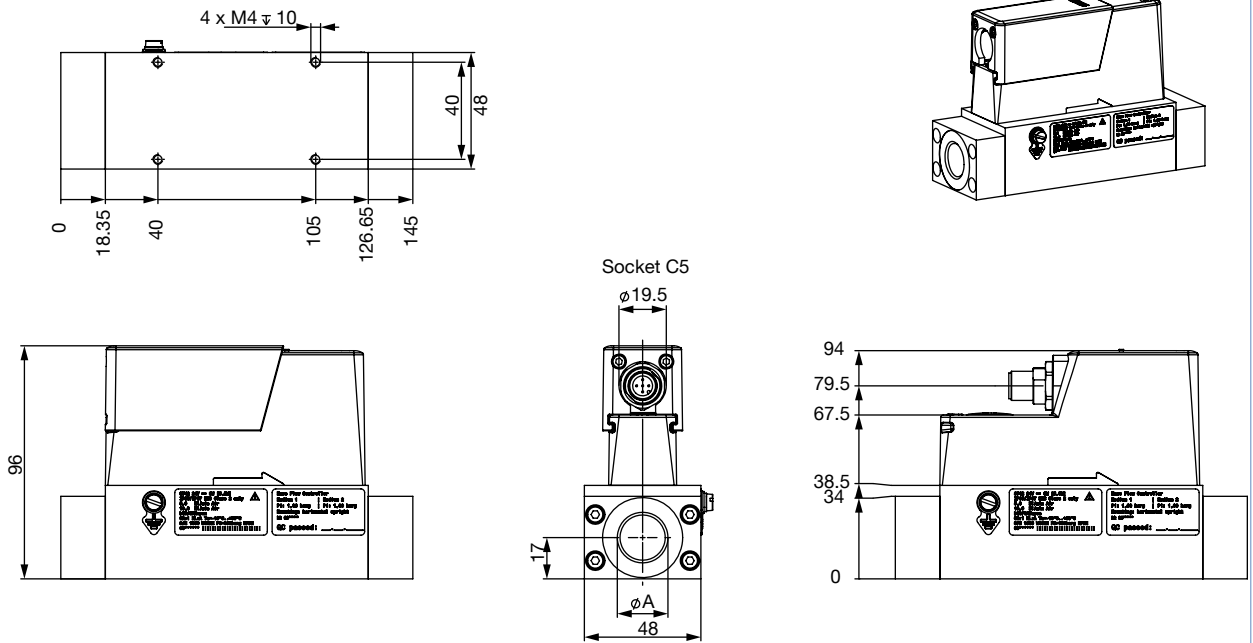


Type 8742 büS / CANopen: MFC version with external valve (Type 2873)

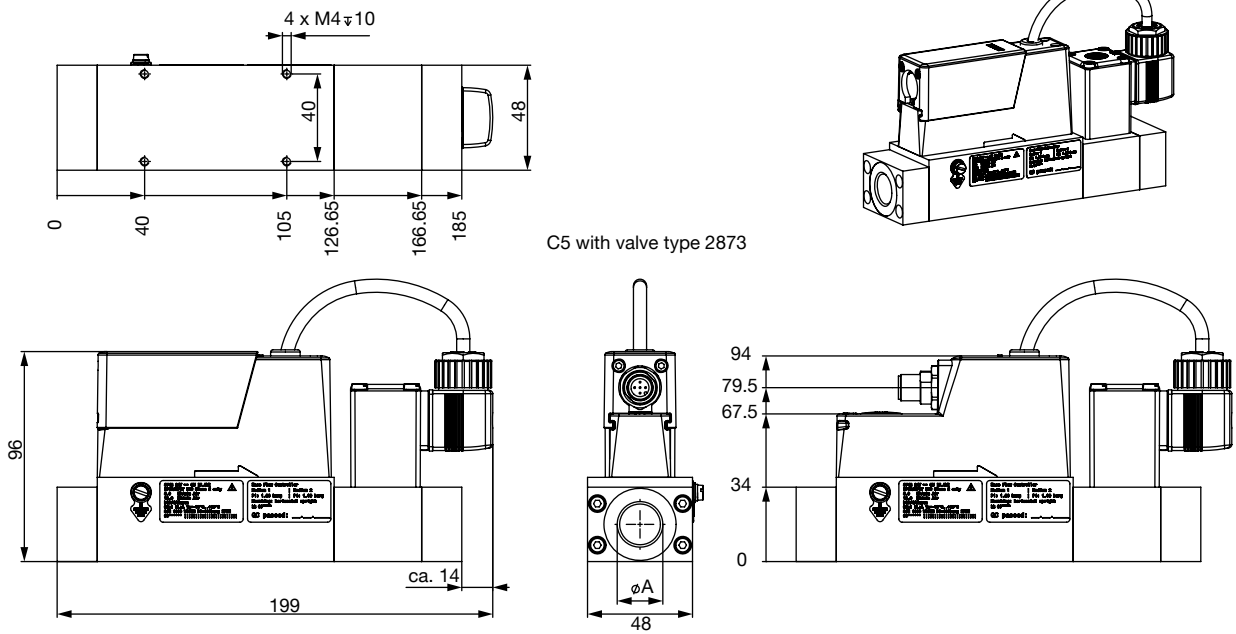


Dimensions [mm]

Typ 8742 büS / CANopen: Ausführung MFM for high nominal flow rates

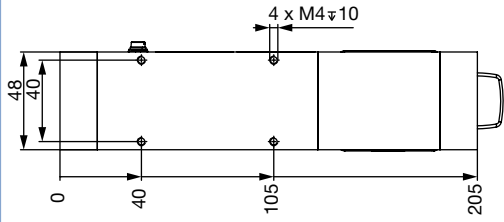


Typ 8742 büS / CANopen: MFC version with external valve (Type 2873) for high nominal flow rates

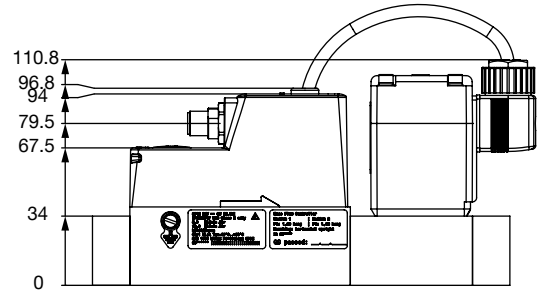
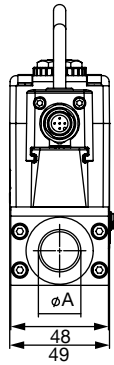
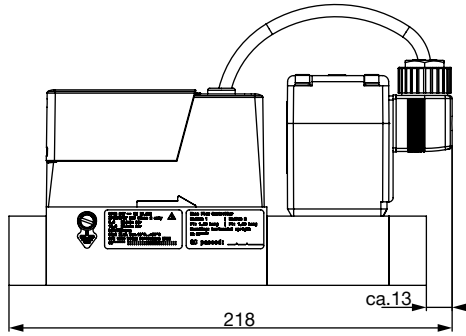
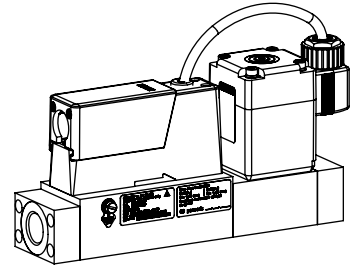


Dimensions [mm]

Type 8742 büS / CANopen: MFC version with external valve (Type 2875) for high nominal flow rates



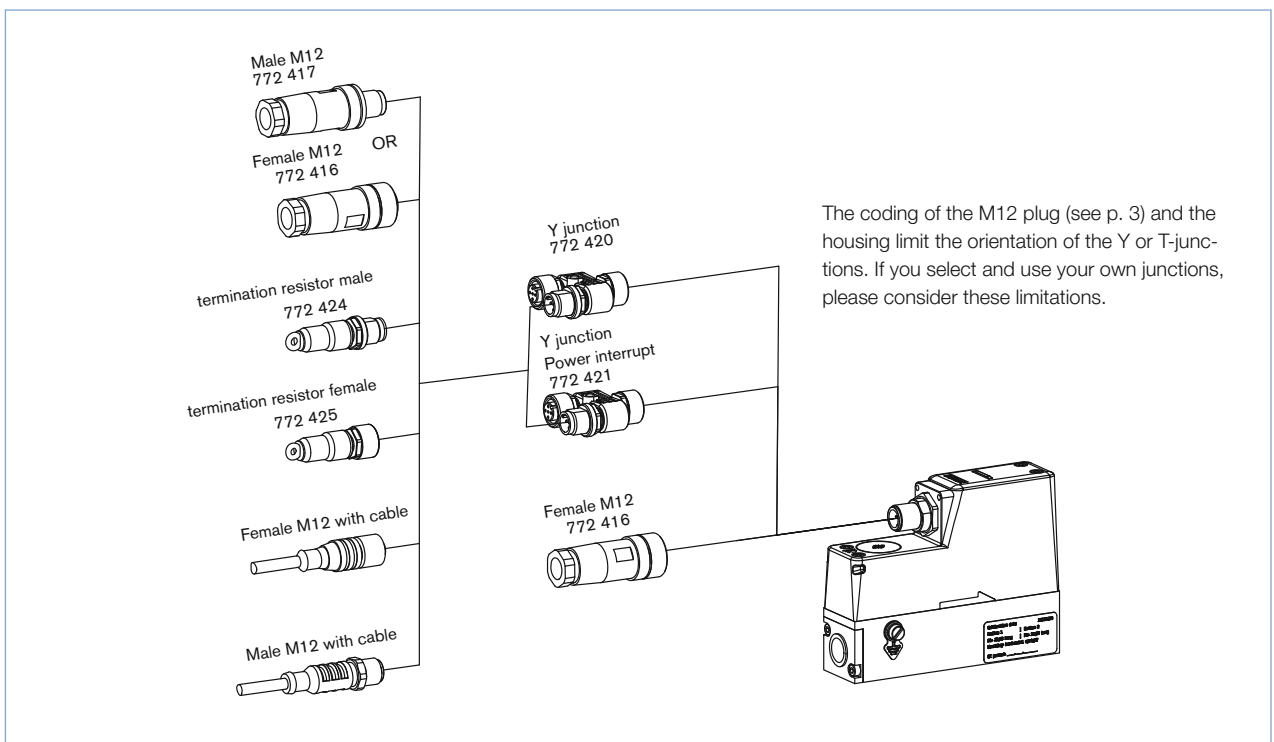
C5 with valve type 2875



## Ordering Chart for Accessories

Article	Item no.
büS cable extension M12 0.1 m	772 492
büS cable extension M12 0.2 m	772 402
büS cable extension M12 0.5 m	772 403
büS cable extension M12 1 m	772 404
büS cable extension M12 3 m	772 405
Power supply Type 1573 for rail mounting, 100 ... 240 V AC / 2 V DC, 1.25A, NEC Class 2 (UL 1310)	772 438
Power supply Type 1573 for rail mounting, 100 ... 240 V AC / 2 V DC, 1A, NEC Class 2 (UL 1310)	772 361
Power supply Type 1573 for rail mounting, 100 ... 240 V AC / 2 V DC, 2A, NEC Class 2 (UL 1310)	772 362
Power supply Type 1573 for rail mounting, 100 ... 240 V AC / 2 V DC, 4A	772 363
Connector M12, female, straight <sup>1)</sup>	772 416
Connector M12, male, straight <sup>1)</sup>	772 417
Connector M12, female, angled <sup>1)</sup>	772 418
Connector M12, male, angled <sup>1)</sup>	772 419
Y-junction	772 420
Y-junction for connecting two separately powered segments of a büS network	772 421
Termination resistor 120 Ohm M12 male	772 424
Termination resistor 120 Ohm M12 female	772 425
büS-Stick Set 1 (inkl. cable (M12 and Micro-USB) Stick with integrated terminating resistor, power supply and software)	772 426
büS-Stick Set 2 (inkl. cable (M12 and Micro-USB) Stick with integrated terminating resistor)	772 551
SIM card	on request
LabVIEW device driver	on request
EDS-File (CANopen)	Download from <a href="http://www.burkert.com">www.burkert.com</a>
Software Bürkert Communicator	Download from <a href="http://www.burkert.com">www.burkert.com</a>

<sup>1)</sup> It is possible that the M12 connectors cannot be used together on the same side of a Y-junction. If that is the case, please use a prefabricated cable which uses typically a thinner connector.



## 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  
 ATEX compliance

## Medium data

Type of gas (or gas proportion in mixtures)

Density  kg/m<sup>3</sup> <sup>9)</sup>

Gas temperature [°C or °F]  °C     °F

Moisture content  g/m<sup>3</sup>

Abrasive components/solid particles  no     yes, as follows:

## Fluidic data

Flow range  $Q_{nom}$   Min.  l<sub>N</sub>/min<sup>9)</sup>     l<sub>g</sub>/min (slpm)<sup>9)</sup>  
 Max.  m<sub>N</sub><sup>3</sup>/h<sup>9)</sup>     kg/h  
 cm<sub>N</sub><sup>3</sup>/min<sup>9)</sup>     cm<sub>g</sub><sup>3</sup>/min (sccm)<sup>9)</sup>  
 l<sub>N</sub>/h<sup>9)</sup>     l<sub>g</sub>/h<sup>9)</sup>

Inlet pressure at  $Q_{nom}$ <sup>10)</sup>     $p_1 =$   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

¼" G-thread (DIN ISO 228/1)

¼" NPT-thread (ANSI B1.2)

with screw-in fitting (acc. to specification for pipeline)

mm Pipeline (external Ø)

inch Pipeline (external Ø)

Flange version

Installation

horizontal

vertical, flow upwards     vertical, flow downwards

Ambient temperature  °C

## Material data

Body base  Aluminium     Stainless steel

Seal  FKM     EPDM

## Electrical data

Signals for set point and actual value  CANopen    or     bÜS

● Please quote all pressure values as overpressures with respect to atmospheric pressure bar(ü)

<sup>9)</sup> at: 1.013 bar(a) and 0 °C

<sup>9)</sup> at: 1.013 bar (a) and 20 °C

<sup>10)</sup> matches with calibration pressure

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

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