

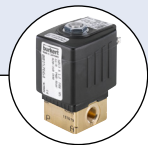
Mass Flow Controller (MFC)/ Mass Flow Meter (MFM) for Gases

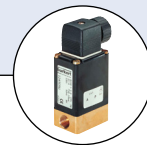


Type 8741 Standard

Type 8741 büS
/ CANopen

Type 8741 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 BUPUS**

The mass flow controller (MFC) / meter (MFM) type 8741 for gases is available in two versions:

MFC / MFM type 8741 Standard: with Industrial Ethernet or analog interface, suitable for a wide range of applications.

MFC / MFM type 8741 büS / CANopen: suitable for the integration in existing CANopen networks, as well as Industrial Ethernet or fieldbus networks in combination with the fieldbus gateway of type ME43. The second option was especially developed for applications with multiple control loops. Up to 32 MFC / MFM can be connected to one fieldbus gateway. Type ME43 translates the internal CANopen based communication (called büS: CANopen with extended functionalities) to industry standards for both Industrial Ethernet and fieldbuses. The mass flow controller / meter can always be switched between büS and CANopen communication.

Type 8741 can be configured as MFM or MFC. Optional, up to four 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 8741 is especially designed for use in cabinets.

- Nominal flow ranges from 0.010 l_N/min to 160 l_N/min
- High accuracy and repeatability
- Very fast response times
- Easy device exchange through configuration memory
- Available in two versions: 8741 Standard and 8741 büS / CANopen

Technical data	
Nominal flow range (Q_{nom})	10 ml _N /min to 160 l _N /min (N ₂)
Turn-down ratio	50:1, optional 100:1
Operating medium	Neutral, non-contaminated gases, others on request
Calibration medium	Operating gas or air
Max. operating pressure (overpressure to the atmospheric pressure)	10 bar (145 psi), with MFCs the max. pressure depends on the orifice of the valve
Medium temperature	-10 °C to +70 °C (-10 °C to +60 °C with oxygen)
Ambient temperature	-10 to +50 °C (higher temperatures on request)
Measuring accuracy	±0.8 % o.R. ±0.3 % F.S. (after 1 min. warm up time)
Repeatability	±0.1 % F.S.
Settling (MFC) / response (MFM) time (t_{95%})	<300 ms
Materials	Body: Aluminium or stainless steel Housing: PC (Polycarbonate) Seals: FKM or EPDM (dep. on gas)
Port connection	NPT ¼, G ¼, compression fittings or subbase, others on request
Control valve (prop. valve)	Normally closed
Valve orifice range	0.05...8 mm
k _{vs} value range	0.00006...1.1 m³/h
Power Supply	24 V DC
Voltage tolerance	±10 %
Residual ripple	±2 %
Power consumption¹⁾	1...3 W (as MFM), Max. 3...12 W (as MFC, depending on type of solenoid control valve)

¹⁾ 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		
Configuration memory (included in delivery)	Industrial µSIM card for ease of replacement	
Protection class	IP20	
Dimensions	See drawings on p. 5-8	
Total weight	ca. 500 g (aluminium body)	
Installation	Horizontal or vertical	
Device status	RGB-LED based on NAMUR NE107	
Elektrischer Anschluss	8741 Standard	8741 büS / CANopen
Industrial Ethernet	PROFINET, Ethernet/IP, EtherCAT, Modbus-TCP via 2 x RJ45 (Switch) ¹⁾	-
Fieldbus	-	büS (CAN-based Bus) / CANopen via terminal block, 4 pin
Analog	4...20 mA, 0...20 mA, 0...10 V or 0...5 V via D-Sub9 ²⁾ or terminal block 6 pin	-
Input impedance	>20 kΩ (voltage), <300 Ω (current)	
Max. current (Voltage output)	10 mA	
Max. load (Current output)	600 Ω	

¹⁾ Supply voltage via separate terminal block

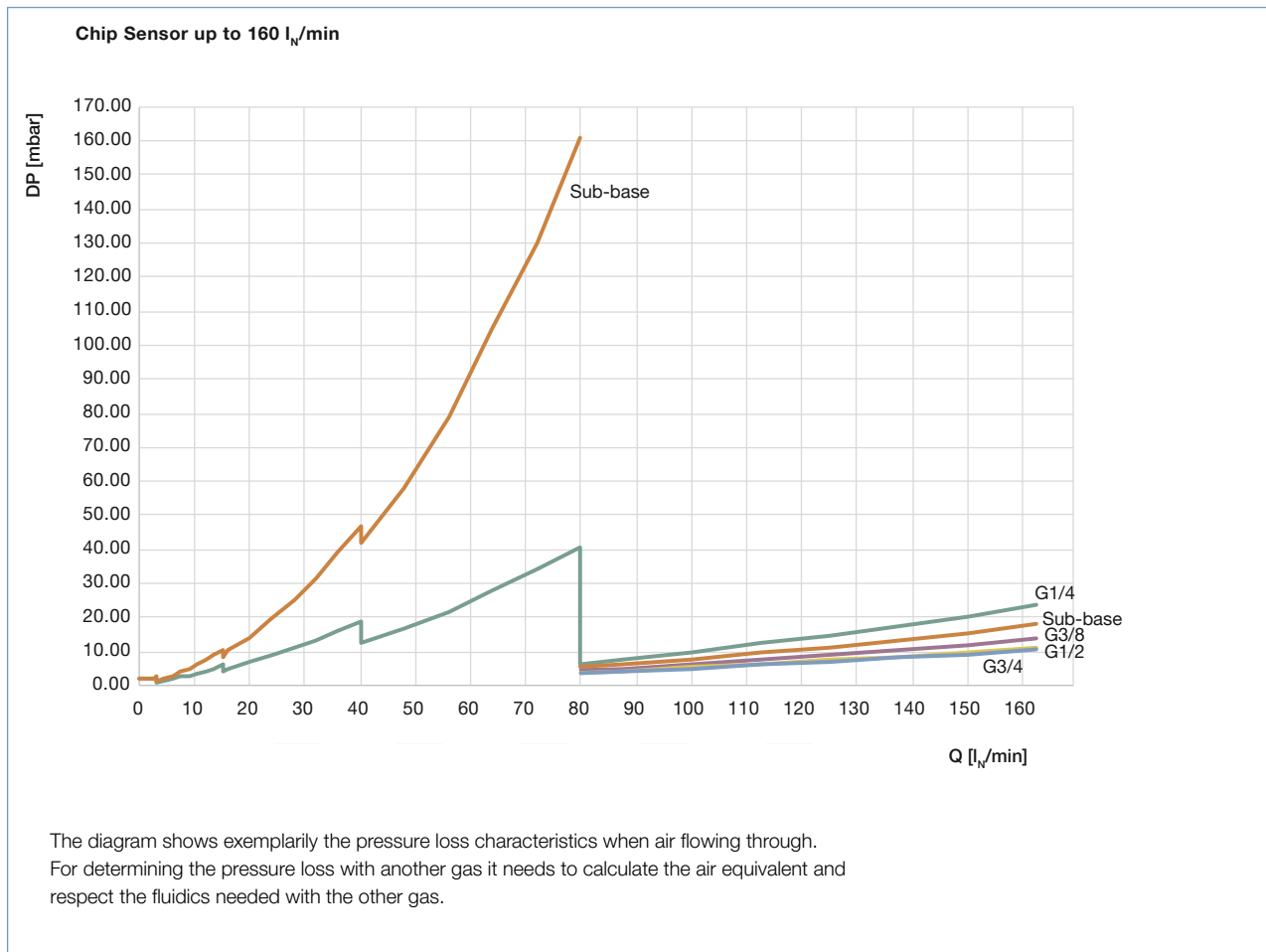
²⁾ The analog version with D-Sub9 features an additional digital input and a relay output

Nom. flow ranges of typical gases³⁾

Gas	Min. Q _{nom} [l _N /min]	Max. Q _{nom} [l _N /min]
Argon	0.01	160
Acetylene	0.01	65
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

³⁾ All values refer to 1.013 bara and 0 °C (Index N)

Pressure Loss Diagram of a MFM (ref. to air)



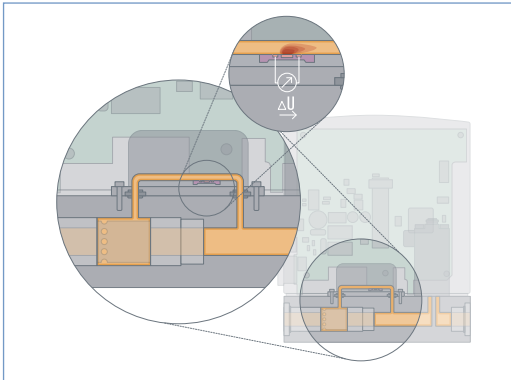
Notes Regarding the Configuration

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. 13 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 13 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



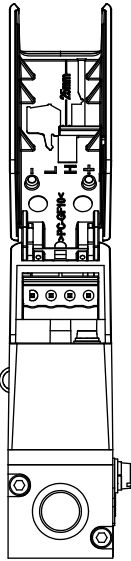
The actual flow rate is detected by a sensor. This operates according to a thermal principle which has the advantage of providing the mass flow which is independent on pressure and temperature.

A small part of the total gas stream is diverted into a small, specifically designed bypass 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.

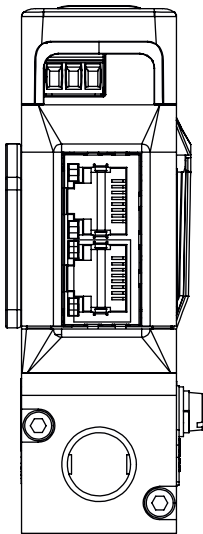
Pin Assignment

8741 büS / CANopen



Terminal block 4 pin	Pin	Assignment
	1	DGND
	2	CANL
	3	CANH
	4	+24 V DC
Screw M3		
<p>Functional earth</p>		When using Bürkert büS cables, the following colour coding applies: <ul style="list-style-type: none"> • red +24 V DC • blue CANL • white CANH • black GND

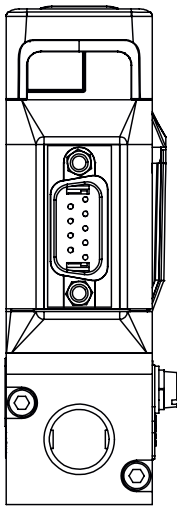
8741 Industrial Ethernet



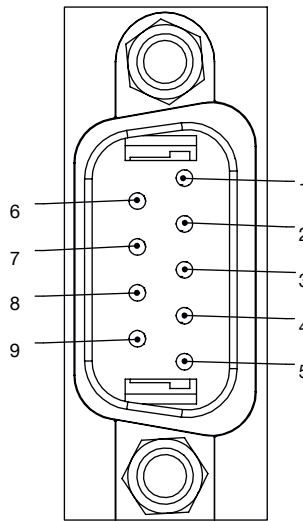
Terminal block 3 pin	Pin	Assignment
	1	FE (Functional earth)
	2	DGND
	3	+24 V DC
RJ45 Socket	Pin	Assignment
	1	TX +
	2	TX -
	3	RX +
	4	not connected
	5	not connected
	6	RX -
	7	not connected
	8	not connected
Body	shield	

Pin Assignment, continued

8741 Analog

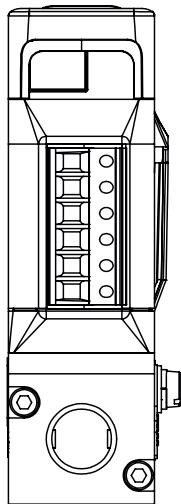


D-Sub 9 pin, plug

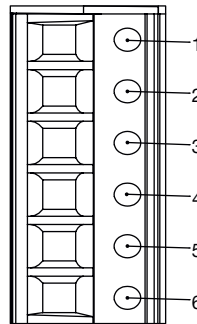


Pin	Assignment
1	Digital input
2	GND (For supply voltage and digital input)
3	+24 V DC
4	Relay - Opener
5	Relay - Reference contact
6	Set value input +
7	Set value input GND
8	Actual value output
9	Actual value output GND
Body	shield

8741 Analog



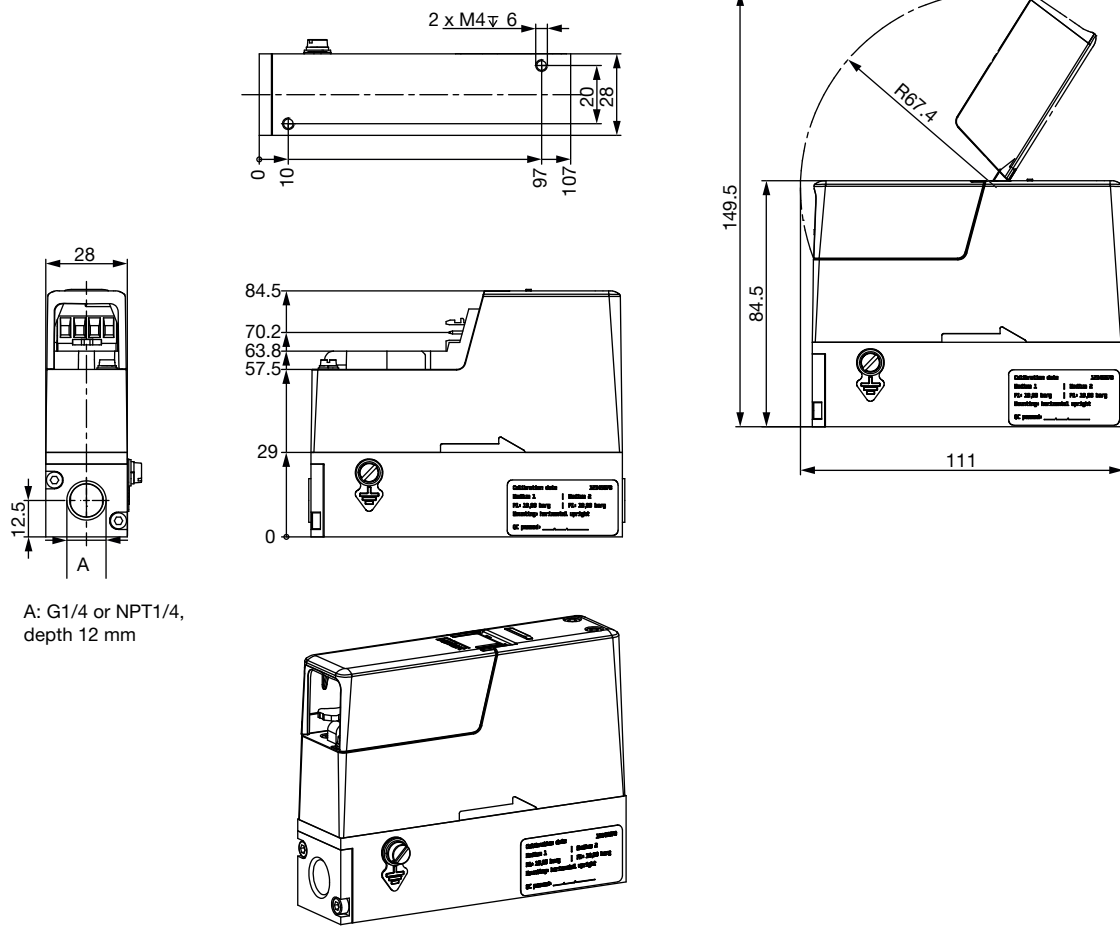
Terminal block 6 pin



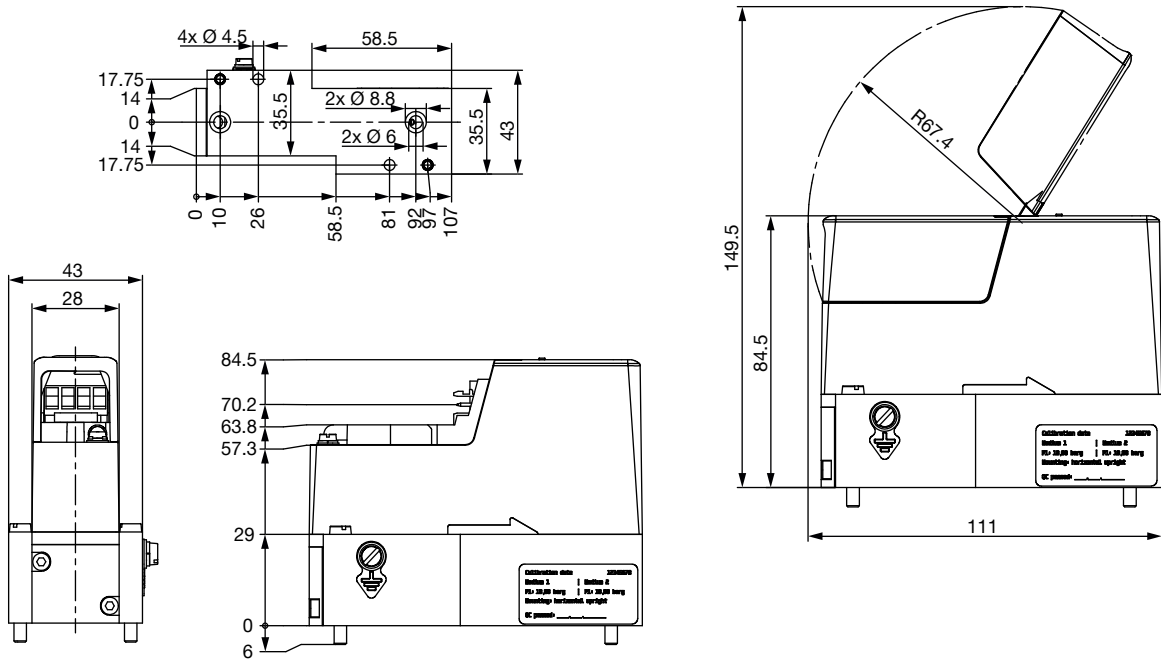
Pin	Assignment
1	+24 V DC
2	GND
3	Set value input +
4	Set value input GND
5	Actual value output +
6	Actual value output GND

Dimensions [mm] 8741 büS / CANopen

Type 8741 büS / CANopen: MFM or MFC version with integrated valve (Type 2871)

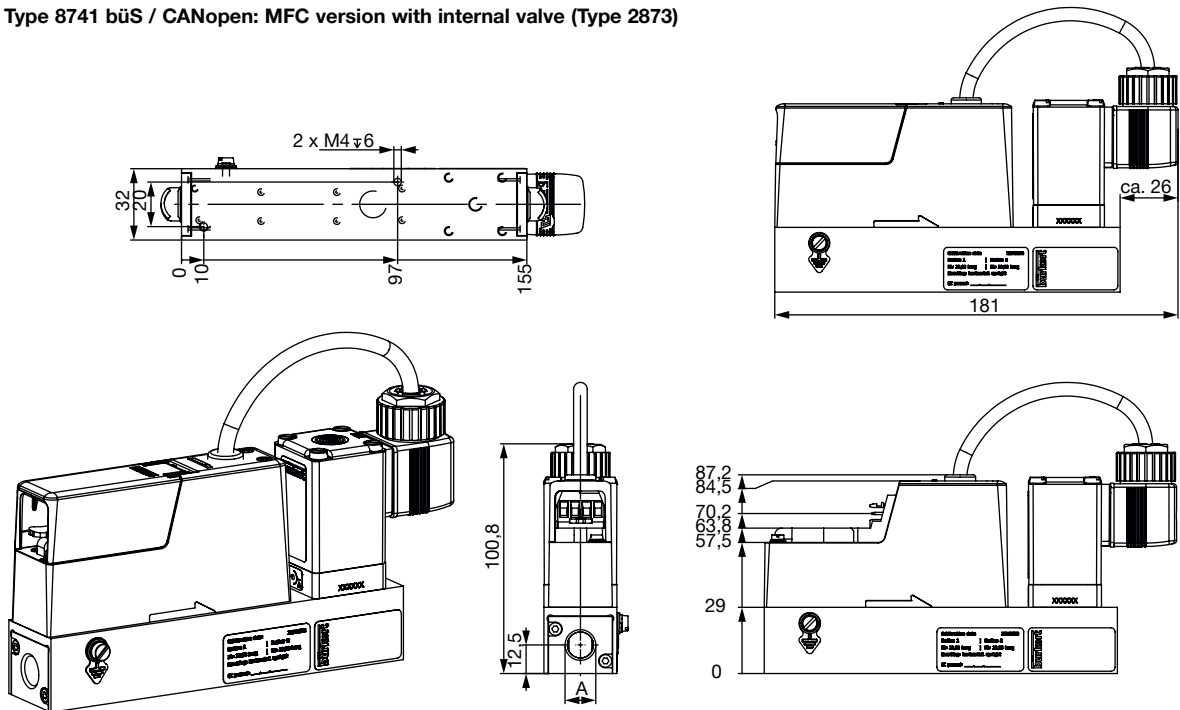


Type 8741 büS / CANopen: Sub-base version MFM or MFC with integrated valve (Type 2871)

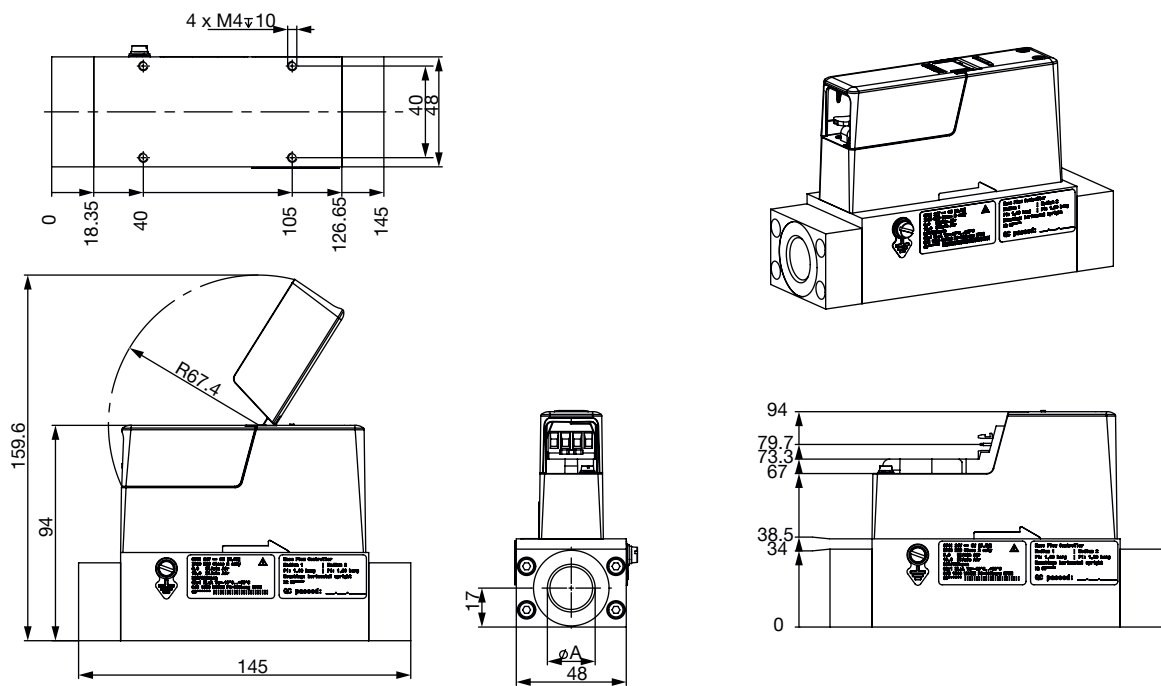


Dimensions [mm] 8741 büS / CANopen, continued

Type 8741 büS / CANopen: MFC version with internal valve (Type 2873)

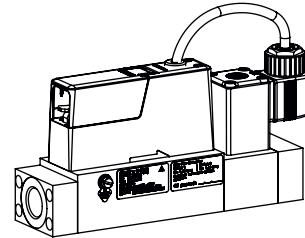
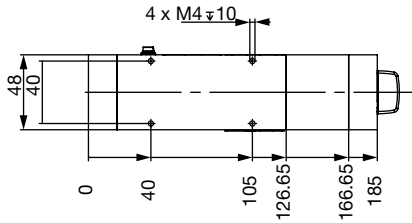


Type 8741 büS / CANopen: MFM version for large nominal flow rates

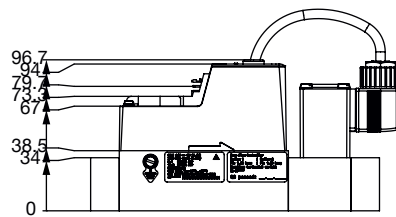
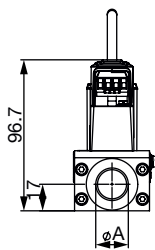
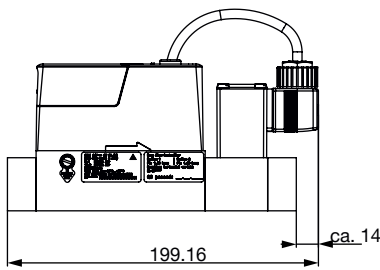


Dimensions [mm] 8741 büS / CANopen, continued

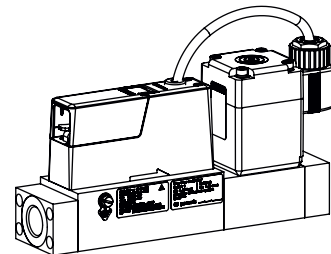
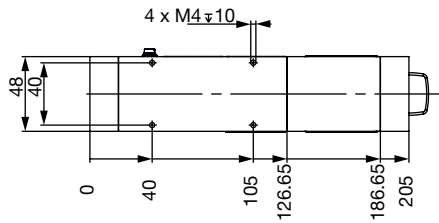
Type 8741 büS / CANopen: MFC version with external valve (Type 2873) for large nominal flow rates



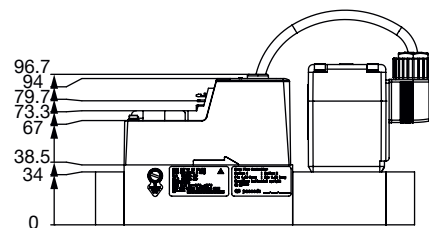
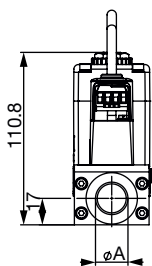
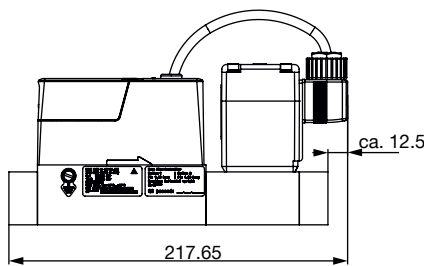
C5 with valve type 2873



Type 8741 büS / CANopen: MFC version with external valve (Type 2875) for large nominal flow rates

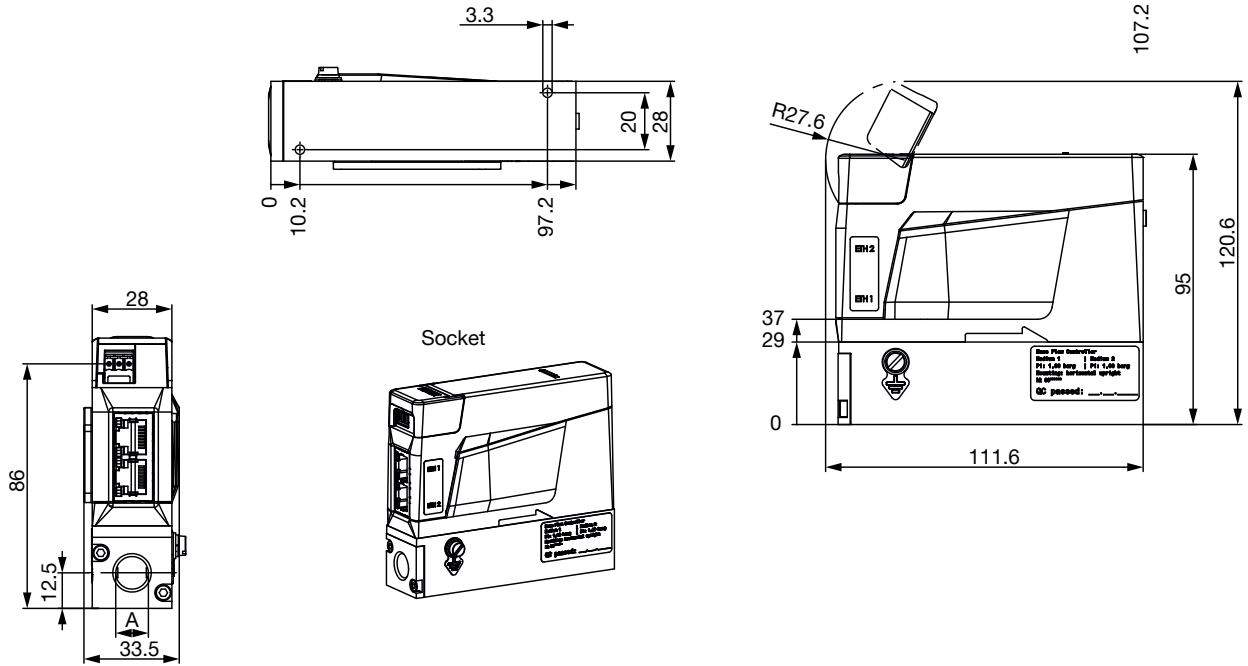


C5 with valve type 2875

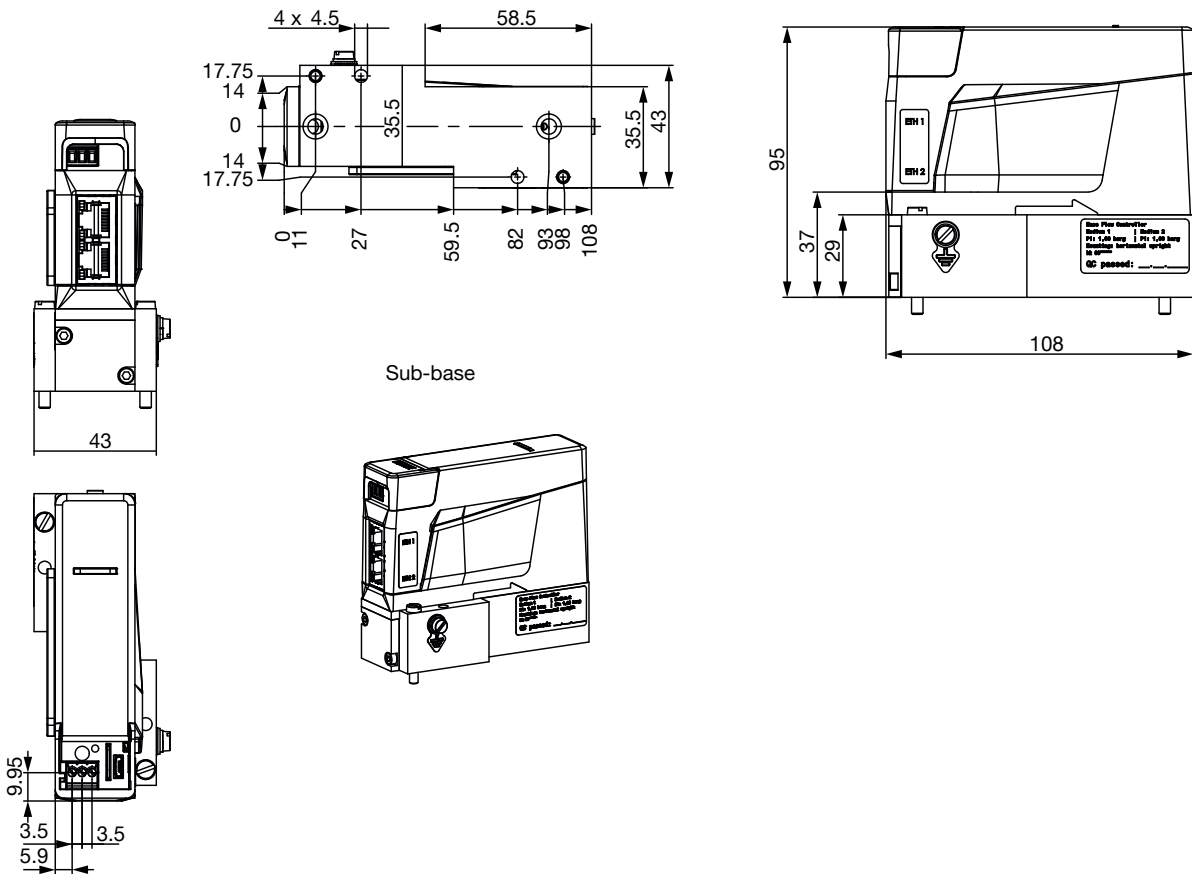


Dimensions [mm] 8741 Standard

Type 8741 Standard: MFM or MFC version with internal valve (Type 2871)

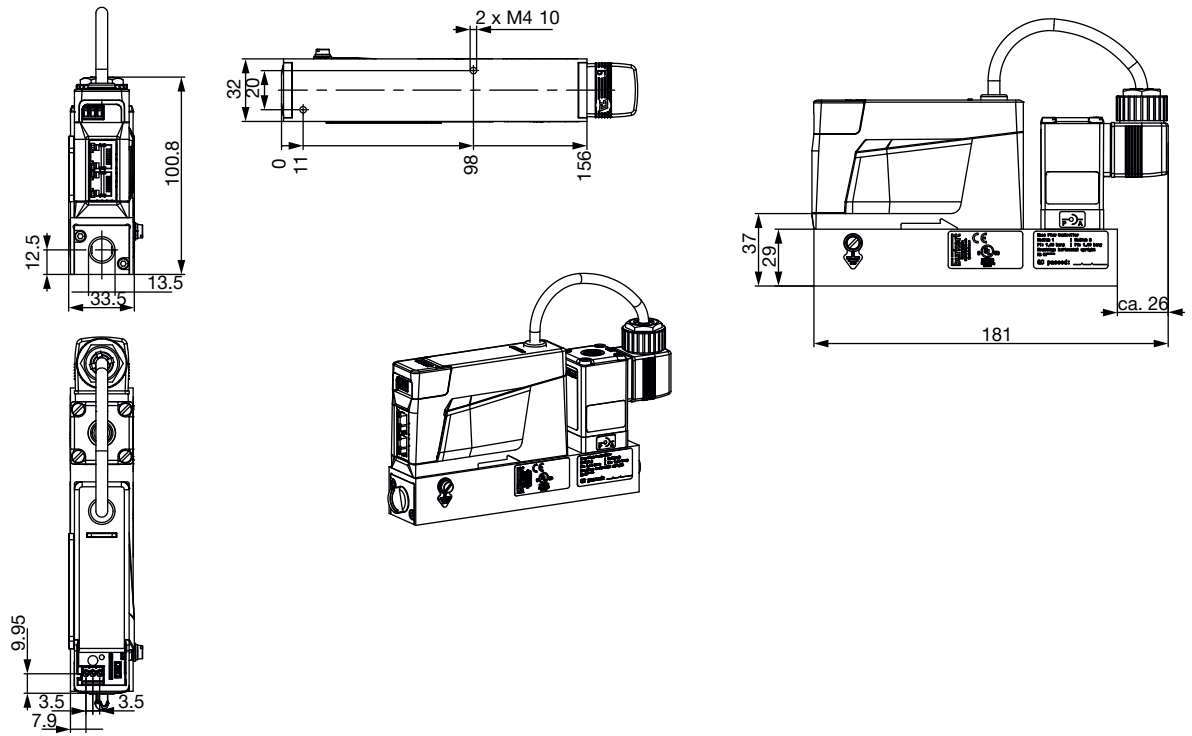


Type 8741 Standard: Sub-base version MFM or MFC with internal valve (Type 2871)

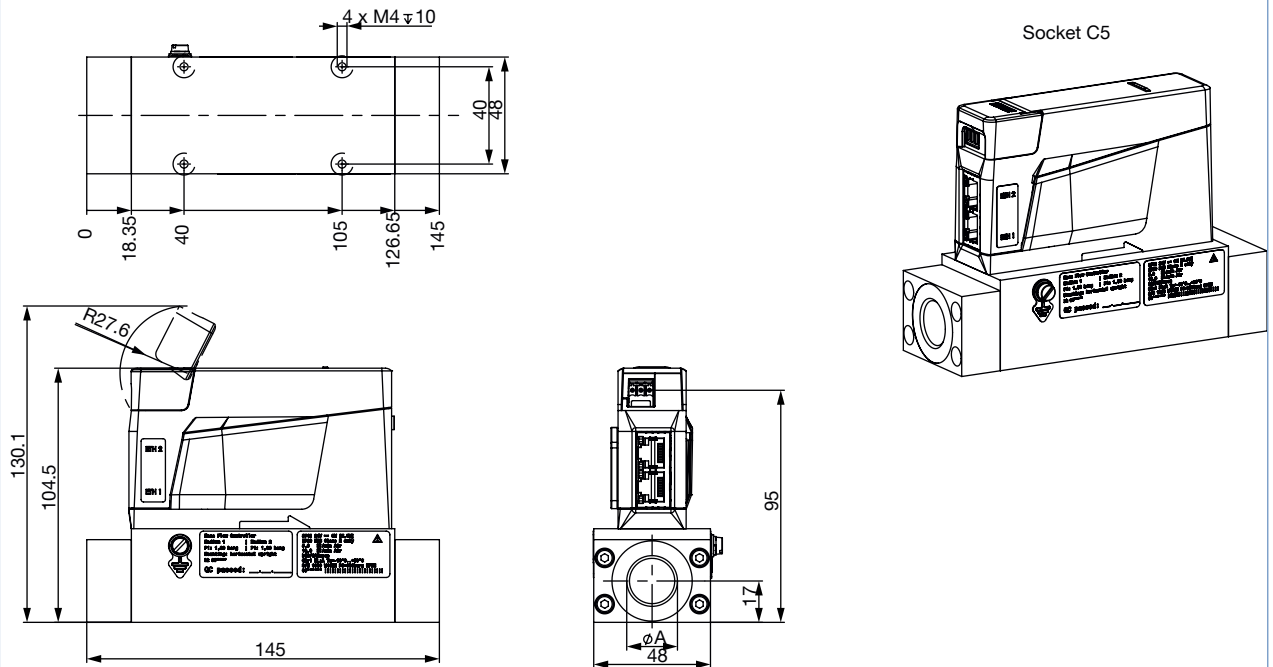


Dimensions [mm] 8741 Standard , continued

Type 8741 Standard: MFC version with external valve (Type 2873)

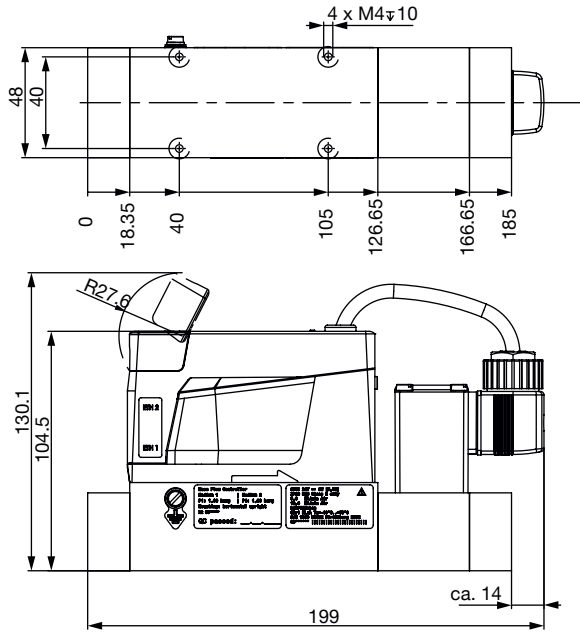


Type 8741 Standard: MFM version for large nominal flow rates

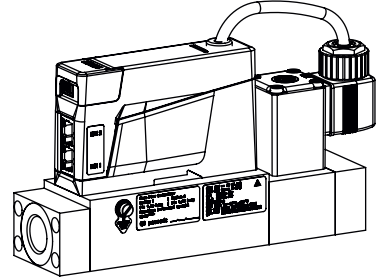


Dimensions [mm] 8741 Standard , continued

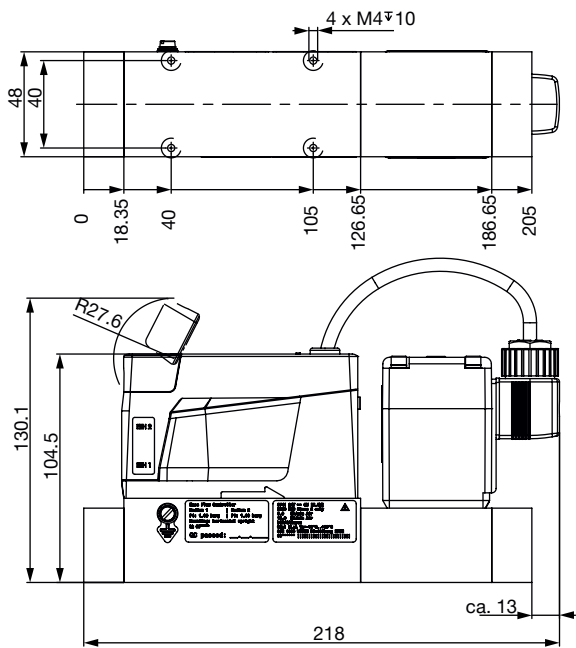
Type 8741 Standard: MFC version with external valve (Type 2873) for large nominal flow rates



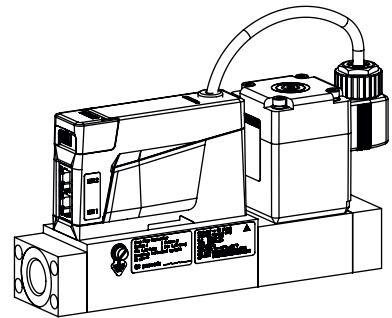
C5 with valve type 2873



Type 8741 Standard: MFC version with external valve (Type 2875) for large nominal flow rates



C5 with valve type 2875



Ordering chart for accessories

Article	Article no.
büS-Stick Set 1 (inkl. cable (M12 and Micro-USB), büS-Stick with integrated terminating resistor, power supply and other accessories)	772426
büS-Stick Set 2 (inkl. cable (M12 and Micro-USB) and büS-Stick with integrated terminating resistor)	772551
Power supply Type 1573 for rail mounting, 100 ... 240 V AC/ 24 V DC, 1.25 A, NEC Class 2 (UL 1310)	772438
Power supply Type 1573 for rail mounting, 100 ... 240 V AC/ 24 V DC, 1 A, NEC Class 2 (UL 1310)	772361
Power supply Type 1573 for rail mounting, 100 ... 240 V AC/ 24 V DC, 2 A, NEC Class 2 (UL 1310)	772362
Power supply Type 1573 for rail mounting, 100 ... 240 V AC/ 24 V DC, 4 A	772363
µSIM-Karte (included in delivery of MFC)	on request
LabVIEW device driver	on request
Device description files for CANopen (EDS), PROFINET (GSDML), Ethernet/IP (EDS), EtherCAT (ESI)	Download from www.burkert.com
Software Bürkert Communicator	Download from www.burkert.com
For 8741 büS / CANopen	
Terminal block 4 pin (included in delivery)	565876
Terminal block 4 pin with integrated 120 Ohm resistance for büS-ending	566066
büS cable, 50 m	772413
büS cable, 100 m	772414
Feldbus Gateway Type ME43 for Industrial Ethernet (PROFINET, Ethernet/IP, Modbus/TCP, EtherCAT)	307390
Feldbus Gateway Type ME43 for PROFIBUS DPV1	307393
For 8741 Analogue	
Terminal block 6 pin (for 8741 Standard; included in delivery of the corresponding analog version)	on request
Connector cable D-Sub 9 to leads, 5 m	580882
Connector cable D-Sub 9 to leads, 10 m	580883

To connect the MFC / MFM with the „Bürkert Communicator“ software tool, you need a büS-stick.

The büS-Stick sets contain the necessary accessories.

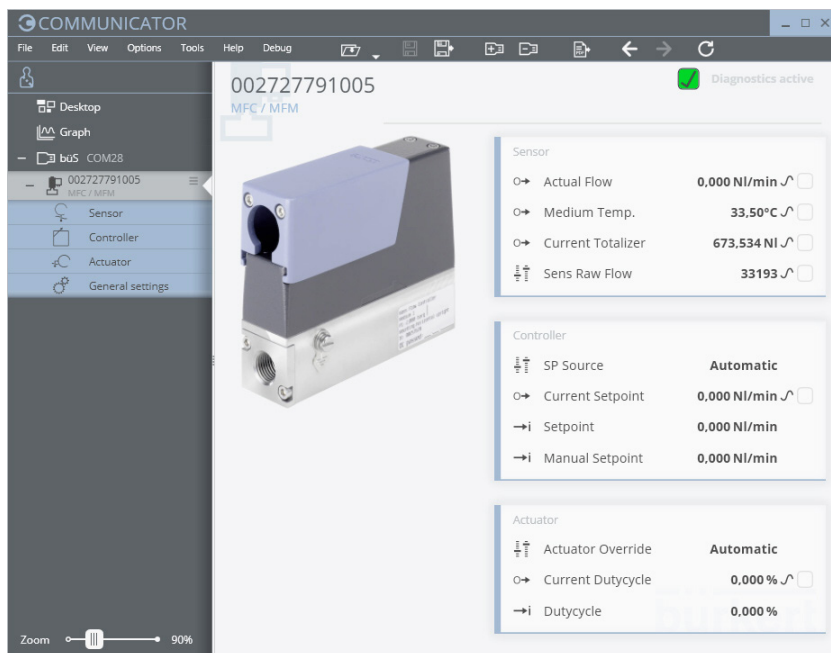
For type 8741 büS / CANopen, the connection is made directly via the 4 pin terminal block (büS-Stick Set 1 contains the necessary accessories).

For type 8741 Standard the connection is made via the micro-USB socket on the device (büS-Stick Set 2 contains the necessary accessories).

Attention: The interface to the „Bürkert Communicator“ software tool is based on CANopen (also for type 8741 Standard). The appropriate bus termination is mandatory. Hence, please activate the connectible termination resistor on the büS-Stick for type 8741 Standard.

For type 8741 büS / CANopen, this termination resistor should not be activated, in case the device is already integrated in a properly terminated bus network

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 büS 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 büS 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.

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

Mediumsangaben

Type of gas (or gas proportion in mixtures)

Density kg/m³ ¹⁾

Gas temperature [°C or °F] °C °F

Moisture content g/m³

Abrasive components/solid particles no yes, as follows:

Fluidic data

Flow range Q_{nom} Min. l_N/min¹⁾ l_S/min (slpm)²⁾
 Max. m_N³/h¹⁾ kg/h
 cm_N³/min¹⁾ cm_S³/min (sccm)²⁾
 l_N/h¹⁾ l_S/h²⁾

Inlet pressure at Q_{nom} ³⁾ $p_1 =$ 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) others:
 1/4" NPT-thread (ANSI B1.2)
 with screw-in fitting (acc. to specification for pipeline)
 mm Pipeline (external Ø)
 inch Pipeline (external Ø)
 Sub-base version

Installation horizontal
 vertical, flow upward vertical, flow down

Ambient temperature °C

Material data

Body base Aluminium Stainless steel

Seal FKM EPDM

Electrical data

Signale für Sollwerteingang/Istwertausgang

8741 büS / CANopen: CANopen or büS

8741 Standard: PROFINET Ethernet/IP EtherCAT Modbus-TCP
 4-20 mA 0-20 mA 0-10 V 0-5 V terminal block-version
Default: D-Sub

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

¹⁾ at: 1.013 bar(a) and 0 °C²⁾ at: 1.013 bar (a) and 20 °C³⁾ matches with calibration pressureTo find your nearest Bürkert facility, click on the orange box → www.burkert.comIn case of special application conditions,
please consult for advice.Subject to alteration.
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