Bartels mikrotechnik

Bartels Micropumps

Micropumps transporting the tiniest amounts of gases or liquids can be considered the heart of microfluidics.

In many sectors they have become indispensable. Moving diagnostic samples in the device, dosing lubricants, feeding sensors with sample gas or mixing starch into the steam of flat irons are only a few of the manifold tasks they can fulfill. Many further fields of application for example are located in medical technologies and analytics.

Extremely small in size and low in weight, with good particle tolerance and temperature resistance, Bartels micropumps are well prepared to be used in any of these sectors. As they are almost completely made of plastics, large quantities of these pumps can be produced at low cost and so may well be used as disposables.

The functional principle of the Bartels micropumps is based on a piezoelectric diaphragm in combination with passive check valves. A piezo ceramic mounted on a coated brass membrane is deformed when voltage is applied. By the resulting down stroke, the medium is being displaced out of the pump chamber below. The check valves on both sides of the pump chamber define the flow direction. When the voltage decreases, the corresponding piezo deformation causes an upstroke of the membrane. The medium is sucked in and the chamber is filled again. In every second, the pump can do several hundreds of such pumping cycles. The pumping performance can be influenced by adjustment of the parameters.

Important advantages for all users result from the radically simple pump design: Injection molded parts for housing and pump chamber, piezo actuators and passive valves constitute the key components. Thus any adaptation to specific requirements concerning flow rate or back pressure is easy to realize. This customization of micropumps with the appropriate electronic controllers is part of the services offered by Bartels microComponents. If requested, the pumps can be fully integrated into complex system designs as well.

Once the perfect pump for your application has been found, you may purchase an exclusive production license for this version to include the component into your own production processes. Of course Bartels microComponents can also realize a high quality serial production for you at low cost.

**mp6 micropump series (mp6-hyb, mp6-liq, mp6-gas, mp6-gas+, mp6-pi and mp6-pp)**

The Bartels micropump mp6-series combines two piezo actuators inside a single housing. This pump version joins the established functional principle and central advantages of its parent generation mp5 with its own specific innovative features. The small power pack can handle twice the back pressure the mp5 can cope with, has an increased priming capability and is of higher bubble tolerance, so that even gas-liquid-mixtures can be pumped without issues. Its low power consumption is a further advantage. In the entire pump (mp6-hyb, mp6-gas) only one material comes into contact with the medium, all parts in medium contact are made of polyphenylsulfone (PPSU). The mp6-pi has its valve foil made of polyimide (PI) and the remaining wetted components made out of polyphenylsulfone (PPSU). The mp6-pp has its valve foil made out of polyimide (PI) and the remaining wetted components made out of polypropylene (PP).

The mp6-hyb, mp6-gas and mp6-pi can already be offered at low prices for large quantities due to an automated assembly. The mp6-pp is produced half-automated but can be transferred into automated serial production for large quantities.
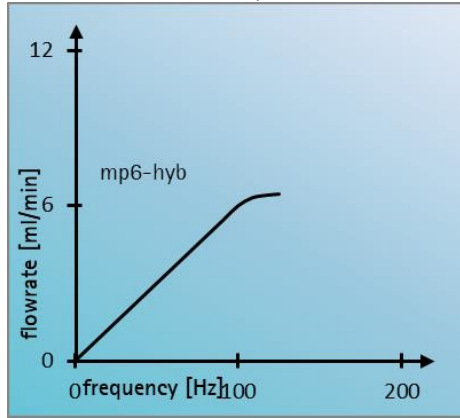
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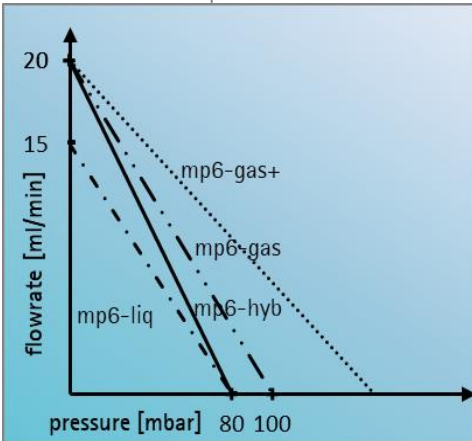Typical characteristics of the Bartels micropumps:
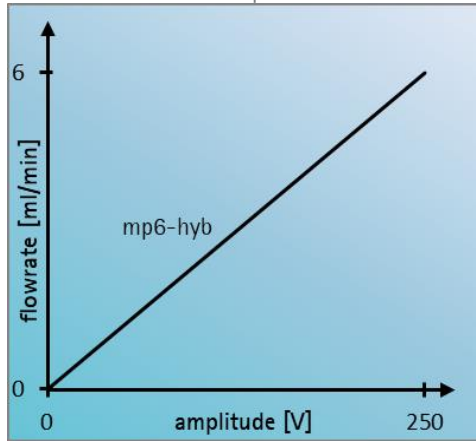
volume flow vs pressure
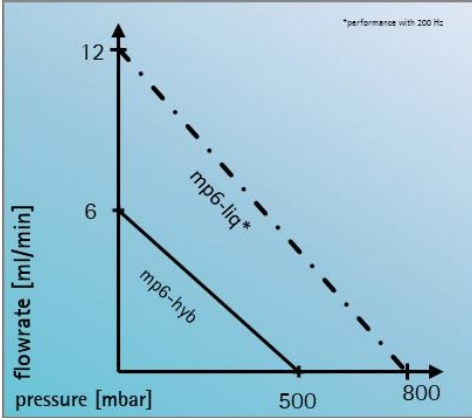
volume flow versus frequency

volume flow versus pressure

volume flow versus amplitude

The micropump mp6-pi does have the same performance behavior as the micropump mp6-hyb.

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Content

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Bartels mikrotechnik

Technical Data of the mp6–hyb[1]

mp6–hyb	Order code: mp6-hyb
Pump type	piezoelectric diaphragm pump
Number of actuators	2
Dimensions without connectors	30 x 15 x 3,8 mm 1.1811 x 0.5906 x 0.1498 in.
Weight	2 g
Fluidic connectors	barbed tube clip, (outer diameter 1.9 mm, length 3.5 mm) [2]
Electric connector	flex connector 1.25 mm pitch
Power consumption	~ 50 mW [6]
Self-priming	yes [3]
Pumping media	Liquids and gases
Operating temperature	0–70°C
Life time	5000 h [6]
IP code	IP33 [7]
Material in contact with media	polyphenylsulfone (PPSU) [8]
Suitable pump driver	mp-x, mp6-EVA, mp6-OEM, mp6-QuadOEM and mp6-QuadKEY
Typical values of flow and back pressure for selected media (values measured with mp-x: 100 Hz, 250 V, SRS):	
Liquids – water	
Controllable flow range[9] Q	8 µl/min – 10000 µl/min
typ. flow rate Q (p=0)	8 ml/min [4]
typ. back pressure p (Q=0)	500 mbar (7,25 psi) [4]
Gases - air	
typ. volume flow Q(p=0)	30 ml/min [5]
typ. back pressure p (Q=0)	80 mbar (1,16 psi) [5]
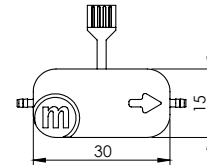
[1]   Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2]   Recommended tubing: Tygon tubing 1.3 mm inner diameter.
[3]   Conditions: Suction pressure > 10 mbar, DI water, settings mp-x: 100 Hz, 250 V, SRS, the volume flow will be reached after a few minutes of operation time.
[4]   Conditions: DI water (25°C), room temperature 23°C, settings mp-x: 100 Hz, 250 V, SRS
[5]   Conditions: air, room temperature 23°C, mp-x: 300 Hz, 250 V, SRS
[6]   Conditions: settings mp-x: 100 Hz, 250 V, SRS
[7]   Can be changed to IP44.
[8]   For media compatibility details please find more information in the corresponding media compatibility sheets.
[9]   Controllable with frequency, voltage, signal form and more. Please contact us for more information.

Please find more information concerning the controller and the equipment in the corresponding manuals.

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Technical Data of the mp6–liq[1, 2]

mp6–liq	Order code: mp6-liq
Pump type	piezoelectric diaphragm pump
Number of actuators	2
Dimensions without connectors	30 x 15 x 3,8 mm 1.1811 x 0.5906 x 0.1498 in.
Weight	2 g
Fluidic connectors	barbed tube clip, (outer diameter 1.9 mm, length 3.5 mm) [3]
Electric connector	flex connector 1.25 mm pitch
Power consumption	~ 50 mW [6]
Self-priming	yes [4]
Pumping media	Liquids and mixtures
Operating temperature	0–70°C
Life time	5000 h [6]
IP code	IP33 [7]
Material in contact with media	polyphenylsulfone (PPSU) [8]
Suitable pump driver	mp-x, mp6-XEVA, mp6-XOEM, mp6-QuadOEM and mp6-QuadKEY
Typical values of flow and back pressure for selected media (values measured with mp-x: 200 Hz, 250 V, SRS):	
Liquids – water	
Controllable flow range[9] Q	8 µl/min – 13000 µl/min
typ. volume flow Q (p=0)	11 ml/min [5]
typ. back pressure p (Q=0)	800 mbar (11,6 psi) [5]
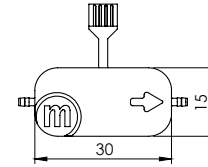
[1] Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2] Preliminary values, changes will occur on series prodcution
[3] Recommended tubing: Tygon tubing 1.3 mm inner diameter.
[4] Conditions: Suction pressure > 10 mbar, DI water, settings mp-x: 100–200 Hz, 250 V, SRS, the max. volume flow will be reached after a few minutes of operation time.
[5] Conditions: DI water (25°C), room temperature 23°C, settings mp-x: 200 Hz, 250 V, SRS
[6] Conditions: settings mp-x: 200 Hz, 250 V, SRS
[7] Can be changed to IP44.
[8] For media compatibility details please find more information in the corresponding media compatibility sheets.
[9] Controllable with frequency, voltage, signal form and more. Please contact us for more information.

Please find more information concerning the controller and the equipment in the corresponding manuals.

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Technical Data of the mp6-pi[1]

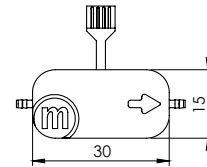| mp6-pi	Order code: mp6-pi
Pump type	piezoelectric diaphragm pump
Number of actuators	2
Dimensions without connectors	30 x 15 x 3,8 mm 1.1811 x 0.5906 x 0.1498 in.
Weight	2 g
Fluidic connectors	barbed tube clip, (outer diameter 1.9 mm, length 3.5 mm) [2]
Electric connector	flex connector 1.25 mm pitch
Power consumption	~ 50 mW [5]
Self-priming	yes [3]
Pumping media	Liquids and mixtures
Operating temperature	0–70°C
Life time	5000 h [5]
IP code	IP33 [6]
Material in contact with media	Polyimid foil (PI), polyphenylsulfone (PPSU)[7]
Suitable pump driver	mp-x, mp6-EVA, mp6-OEM, mp6-QuadOEM and mp6-QuadKEY
Typical values of flow and back pressure for selected media **(values measured with mp-x: 100 Hz, 250 V, SRS):**	
Liquids – water	
Controllable flow range[8] Q	8 µl/min – 8000 µl/min
typ. flow rate Q (p=0)	6 ml/min [4]
typ. back pressure p (Q=0)	500 mbar (7,25 psi) [4]

[1]   Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2]   Recommended tubing: Tygon tubing 1.3 mm inner diameter.
[3]   Conditions: Suction pressure > 10 mbar, DI water, settings mp-x: 100 Hz, 250 V, SRS, the max. volume flow will be reached after a few minutes of operation time.
[4]   Conditions: DI water (25°C), room temperature 23°C, settings mp-x: 100 Hz, 250 V, SRS
[5]   Conditions: settings mp-x: 100 Hz, 250 V, SRS
[6]   Can be changed to IP44.
[7]   For media compatibility details please find more information in the corresponding media compatibility sheets.
[8]   Controllable with frequency, voltage, signal form and more. Please contact us for more information.

Please find more information concerning the controller and the equipment in the corresponding manuals.

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Technical Data of the mp6-pp[1]

| mp6-pp	Order code: mp6-pp
Pump type	piezoelectric diaphragm pump
Number of actuators	2
Dimensions without connectors	30 x 15 x 3,8 mm 1.1811 x 0.5906 x 0.1498 in.
Weight	2 g
Fluidic connectors	barbed tube clip, (outer diameter MIN 1.77 mm – MAX 1.85 mm, length 3.5 mm) [2]
Electric connector	flex connector 1.25 mm pitch
Power consumption	~ 50 mW [4]
Self-priming	yes [3]
Pumping media	Liquids and mixtures
Operating temperature	0 – 70°C
Life time	5000 h [4]
IP code	IP33 [5]
Material in contact with media	polypropylene (PP), Polyimid foil (PI) [7]
Suitable pump driver	mp-x, mp6-EVA, mp6-OEM, mp6-QuadOEM and mp6-QuadKEY
Typical values of flow and back pressure for selected media (values measured with mp-x: 100 Hz, 250 V, SRS):	
Liquids – water	
Controllable flow range[8] Q	8 µl/min – 4000 µl/min
typ. flow rate Q (p=0)	4 ml/min [4]
typ. back pressure p (Q=0)	500 mbar (7,25 psi) [4]
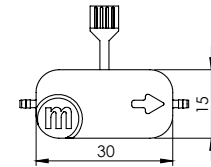
[1]	Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2]	Recommended tubing: Tygon tubing 1.02 mm inner diameter. MIN & MAX values due to injection molding shrink.
[3]	Conditions: Suction pressure > 10 mbar, DI water, settings mp-x: 100 Hz, 250 V, SRS, the max. volume flow will be reached after a few minutes of operation time.
[4]	Conditions: Settings mp-x: 100 Hz, 250 V, SRS signal
[5]	Can be changed to IP44.
[6]	Conditions: DI water (25°C), room temperature 23°C, settings mp-x: 100 Hz, 250 V, SRS
[7]	For media compatibility details please find more information in the corresponding media compatibility sheets.
[8]	Controllable with frequency, voltage, signal form and more. Please contact us for more information.

Please find more information concerning the controller and the equipment in the corresponding manuals.

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Technical Data of the mp6-gas[1]

| mp6-gas	Order code: mp6-gas
Pump type	piezoelectric diaphragm pump
Number of actuators	2
Dimensions without connectors	30 x 15 x 3,8 mm 1.1811 x 0.5906 x 0.1498 in.
Weight	2 g
Fluidic connectors	barbed tube clip, (outer diameter 1.9 mm, length 3.5 mm) [2]
Electric connector	flex connector 1.25 mm pitch
Power consumption	~ 150 mW [5]
Self-priming	yes [3]
Pumping media	gases
Operating temperature	0–70°C
Life time	5000 h [5]
IP code	IP33 [6]
Material in contact with media	polyphenylene sulphone (PPSU) [7]
Suitable pump driver	mp-x, mp6-EVA, mp6-OEM, mp6-QuadOEM and mp6-QuadKEY
Typical values of flow and back pressure for selected media **(values measured with mp-x: 300 Hz, 250 V, SRS):**	
Gases - air	
typ. volume flow Q(p=0)	25 ml/min (300 Hz) [5]
typ. back pressure p (Q=0)	100 mbar (300 Hz) (1,45 psi) [5, 8]
Liquid - water	
typ. volume flow Q(p=0)	8 ml/min (300 Hz) [5]
typ. back pressure p (Q=0)	500 mbar (300 Hz) (1,45 psi) [5, 8]
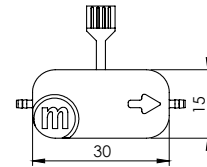
15

30

[1]   Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2]   Recommended tubing: Tygon tubing 1.3 mm inner diameter.
[3]   Conditions: air, room temperature 23°C, settings mp-x: 300 Hz, 250 V, SRS, the max. volume flow will be reached after a few minutes of operation time.
[4]   Conditions: gases, room temperature 23°C, mp-x: 300 Hz, 250 V, SRS
[5]   Conditions: settings mp-x: 300 Hz, 250 V, SRS
[6]   Can be changed to IP44.
[7]   For media compatibility details please find more information in the corresponding media compatibility sheets.
[8]   The mp6-gas is available as mp6-gas+ version with 150 mbar (2,18 psi) of back pressure.

Please find more information concerning the controller and the equipment in the corresponding manuals.

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Bartels ⓜikrotechnik

Prototype

Technical Data of the mpBlower[1, 2]

mpBlower	Order code: mpBlower
Pump type	piezoelectric diaphragm pump
Number of actuators	1
Dimensions without connectors	20 x 20 x 5,8 mm without connectors
Weight	3 g
Power consumption	~ 50 mW [3]
Recommended Operating Voltage	20-25 Vpp
Absolute maximum rating voltage	30 Vpp
driving frequency	> 20 kHz
Pumping media	Gases
build shape	closed system for stable operation
Typical values of flow and back pressure for selected media **(values measured with special electronic: about 22 kHz, 20 V, rect. signal):**	
Gases – air	
typ. volume flow Q(p=0)	500 ml/min [4, 5]
typ. back pressure p (Q=0)	11 mbar [4]
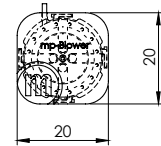
[1]   Typical values. Values can vary under application conditions. Content is subject to changes without notice.
[2]   Preliminary values, changes will occur on series production
[3]   Conditions: electronics settings: 22 kHz ±0.5, 20 V, rect. signal
[4]   Conditions: air, room temperature, 23°C, electronics settings: 22 kHz ±0.5, 20 V, rect. signal
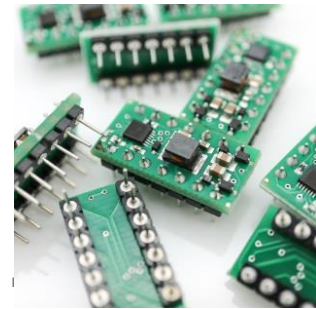[5]   Temperature influences flowrate

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Bartels **m**ikrotechnik

Electronic units for Bartels Micropumps

mp–x controller	Order code: mp–x
Access to the full range of driving parameters. A system for the professional evaluation of the micropumps.	
Dimensions	7,5 x 16 x 20 cm 2.983 x 6.299 x 7.874 in.
Weight	ca. 800 g
Adjustable parameters	amplitude, frequency, signal form
Amplitude range	0 – 250 V
Frequency range	0 - 300 Hz
Signal form	SRS, rectangular, sine
Power supply	mains adaptor
Current consumption	750 mA at 7,5 V
USB-Port	one
connectable micropumps	all pumps of the mp6-series: 1x with mp6-con

mp–x

mp6–OEM controller	Order code: mp6–OEM
The OEM-controller drives the micropump at adjustable performance in a package similar to an integrated circuit. It enables integration into system electronics or on a PCB.	
Dimensions	10,5 x 20,5 x 6 mm 0.4134 x 0.8070 x 0.2362 in.
Adjustable parameters	amplitude, frequency
Amplitude range	85 – 250 Vpp [1]
Frequency range	25 - 226 Hz (Frequencies up to 1000 Hz are possible; please note that the amplitude will decrease in that case. Frequencies down to 1 Hz are possible with an external clock generator.)
Signal form	similar to rectangular
Power supply	2.5 – 5.5 VDC (5 V recommended for optimized performance)
Current consumption	ca. 30 mA at 5 V
Pin arrangement	DIL 14; horizontal ~2.54 mm, vertical ~7.62 mm
[1] amplitude range can go up to 270 Vpp but guaranteed is 250 Vpp	

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mp6-EVA evaluation board	Order code: mp6-EVA

The evaluation board enables the simple use of the micropump based on the mp6 OEM controller. Next to preset standard parameters (235 Vpp, 100 Hz) the mp6 EVA also allows adjusting the pump parameters flexibly, particially by external tuning. For the supply voltage of the module can be provided via USB (no data interface), just attach it to a USB power supply and start the evaluation. Alternatively it can also be supplied by a 2.5 – 5 V voltage source. Optional housing available separately on request (Strapubox 2043)

Dimensions	6,5 x 3 x 2 cm 2.5590 x 1.1811 x 0.7874 in.
Adjustable parameters	Amplitude, frequency
Amplitude range	85 – 250 Vpp [1]
Frequency range	25 - 226 Hz (Frequencies up to 1000 Hz are possible; please note that the amplitude will decrease in that case. Frequecies down to 1 Hz are possible with an external clock generator.)
Signal form	similar to rectangular
Power supply	via USB or 2.5 V – 5.5 VDC
Current consumption	ca. 30 mA at 5 V

[1] amplitude range can go up to 270 Vpp but guaranteed is 250 Vpp

mp6-EVA

mp6-XOEM controller	Order code: mp6-XOEM

The XOEM-controller drives the micropump at adjustable performance in a package similar to an integrated circuit. It enables integration into system electronics or on a PCB.

Dimensions	10,4 x 25,5 x 4.2 mm 0.41 x 1.003 x 0.165 in.
Adjustable parameters	amplitude, frequency, wave form
Amplitude range	10 – 250 Vpp [1]
Frequency range	50 – 800 Hz
Signal form	Sine, rectangular, trapezoid
Power supply	2.5 – 5.0 VDC (5.5 V absolute maximum rating) (5 V recommended for optimized performance)
Current consumption	ca. 30 mA at 5 V
Pin arrangement	DIL 18; horizontal ~2.54 mm, vertical ~7.62 mm

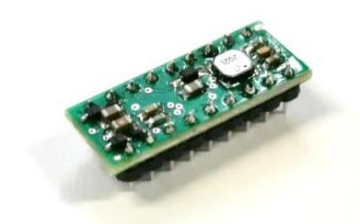[1] amplitude range can go up to 270 Vpp but guaranteed is 250 Vpp
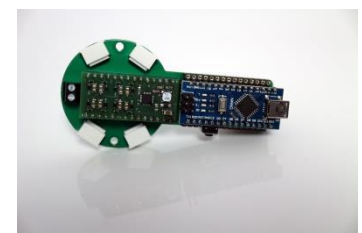
mp6-XOEM also available as mp6-XEVA

mp6-XOEM

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Bartels **m**ikrotechnik

mp6–QuadOEM pump driver for four pumps	Order code: mp6–QuadOEM

The mp6-QuadOEM is a pump driver that allows driving up to four mp6 micropumps simultaneously. It comes in a package similar to an integrated circuit that enables integration into system electronics or on a PCB. The driving frequency, amplitude and also the driving signal is adjustable. Sine signal and rectangle are available amongst others. Every pump can be activated and deactivated individually. This driver is configured and controlled through an I²C interface.

mp6–QuadOEM

Dimensions	38 x 18 x 12 mm 1.50 x 0.71 x 0.47 in.
Adjustable parameters	amplitude, frequency, signal shape
Amplitude range	0 – 260 Vpp
Frequency range	50 - 800 Hz
Signal form	sine, rectangular, other
Interface	I²C
Power supply	2.7 – 5.5 VDC (5 V recommended for optimized performance)
Current consumption	avg. 220 mA, peak 280 mA[1]
Pin arrangement	DIL28; horizontal 2.54 mm, vertical 15.24 mm

[1] four connected mp6-gas@ 260 V and 800 Hz

mp6–QuadKEY evaluation board	Order code: mp6–QuadKEY

The mp6-QuadKEY is an evaluation board that allows controlling the mp6 QuadOEM through an Arduino Nano or pin compatible microcontroller.

Up to four mp6 micropumps can be directly connected to the board. An external power supply terminal is available, but the board can also be powered through the microcontroller USB port. All of the microcontroller port pins are exposed for easy access (to connect external hardware). The mp6-QuadKEY comes with a demo software and source code.

mp6–QuadKEY

Dimensions	92 x 46 x 23 mm 3.62 x 1.81 x 0.91 in.
Adjustable parameters	amplitude, frequency, signal shape
Amplitude range	0 – 260 Vpp
Frequency range	50 - 800 Hz
Signal form	sine, rectangular, other
Interface	USB
Power supply	7.5 – 12 V, 500 mA
Current consumption	avg. 240 mA, peak 300 mA[1]

[1] four connected mp6-gas @ 260 V and 800 Hz

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Accessories for Bartels Micropumps

mp6–con connection cable	Order code: mp6–con
Connector for mp6-series to mp-x	
Design and connectors	– Molex FCC 1.25 mm pitch – 85 cm (33.465 in.) cable – Binder 620 connector

mp6–con

mp6–mol connector	Order code: mp6–mol
Connector to micropump mp6-series for custom made cabling	
Type	Molex FCC 39532045 1.25 mm pitch
Contacts	4
Entry Angle/Orientation	Vertical
PC Tail Length	3.50 mm
Operating temperature	–20°C – 80°C
Voltage	max. 200V
Current	max. 1.0 A per contact
Termination Interface: Style	Through Hole

mp6–mol

mp–cv check valve	Order code: mp–cv
The passive check valve eliminates the back flow of the pumping medium, when the micropump is switched off. It can be connected via tubing.	
Dimensions	21 mm x 5.5 mm (length x wrench size) 0.82677 x 0.2165 in.
Materials in contact with the pumped media	Silicone, stainless steel
Fluidic connectors	barbed tube clip, length : 5.6 mm for tubing with internal diameter: 1.3 mm
Cracking pressure	typical < 35 mbar
Max. back pressure	500 mbar
Typical leak rate	<20 µl/h for DI-water (at 500 mbar)

mp–cv

mp–t tubing	Order code: mp–t ID 1.3 mm
Inlet/outlet compatible Tygon® tubing.	
Inner diameter	1.3 mm
Outer diameter	3 mm
Wall thickness	0.85 mm
Sterilizable	Yes (autoclave or ethylene oxide)
Color	transparent
Suitable micropumps	1 m
Suitable micropumps	mp6–hyb, mp6–gas, mp6–pi, mp6–liq, mp6–gas+

mp–t

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mp–t tubing	Order code: mp–t ID 1.02 mm
Inlet/outlet compatible Tygon® tubing.	
Inner diameter	1.02 mm
Outer diameter	2,74 mm
Wall thickness	0.86 mm
Sterilizable	Yes (autoclave or ethylene oxide)
Color	transparent
Packaging unit	1 m
Suitable micropumps	mp6-pp

mp–t

mp–y tubing connector	Order code: mp–y
Y-connector for tubing, for the parallel use of two micropumps:	
Material	polypropylene (PP)
for tubing inner diameters of	1,3 – 2,6 mm 0.0512 – 0.1024 in.

mp–y

mp–filter	Order code: mp–filter
Protection of fluidic systems from particles.	
Dimensions	21 mm x 5.5 mm 0.82677 in. x 0.2165 in.
Fluidic connectors	barbed tube clip, length : 5.6 mm for tubing with internal diameter: 1.3 mm
Filter porosity	20 – 60 µm

mp–f

mp–hc	Order code: mp–hc
Hose clip to prevent leakage in high pressure applications.	
Inner diameter (when closed)	3 mm
Dimensions	In closed state: 4 mm x 5,1 mm Width (in tube direction): 2 mm
Suitable tube	tygon hose 1.3 mm connected with barbed tube clip

mp–hc

mp–damper	Order code: mp–damper
This damper is designed to reduce the pulsation of fluids from micropumps to allow sensors (for example calorimetric flow sensors) to measure more reliable	
Materials	PPSU/PP, FKM, Epoxy based adhesive
Dimensions	17 x 19 x 5 mm
No of in-/ outlets	2
In- / outlets inner diameter	1,4 mm
In- /outlets outer diameter	1.6 mm
Material in contact with fluids	PPSU, FKM, PP, epoxy based adhesive
Operating temperature	+5°C up to 45°C

mp–damper

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Evaluation-Sets

Order code:	Controller	Pumps
mp6-lab! set	mp-x	6x mp6 (2x mp6-hyb, 2x mp6-gas, 2x mp6-gas+)
mp6-basic set	mp6-EVA (based on mp6-OEM)	
mp6-Quadbasic set	mp6-QuadKEY	
mp6-basic+ set	mp6-XEVA (based on mp6-XOEM)	6x mp6 (2x mp6-hyb, 2x mp6-liq, 2x mp6-gas+)

Order code:	Controller	Pumps
mp6-chemical-lab! set	mp-x	6x mp6 (2x mp6-hyb, 2x mp6-pi, 2x mp6-pp)
mp6-chemical-basic set	mp6-EVA (based on mp6-OEM)	
mp6-chemical-Quadbasic set	mp6-QuadKEY	

Order code:	Controller	Pumps
mp6-lowflow-lab! set	mp-x	3x mp6
mp6-lowflow-basic set	mp6-EVA (based on mp6-OEM)	
mp6-lowflow-Quadbasic set	mp6-QuadKEY	

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Microfluidic systems

Order code:	Controller	Pumps
mpSmartDosing	Specialized for mpSmartDosing, sensors	3x mp6

All sets contain the needed accessories to evaluate the mp6 micropumps, like 1 m tubing, 1 pu mp-hc, in addition and needed for particular sets as well electronic connectors like USB-cable, mini-USB-cable, power supply and mp6-con cable, sensors, damper, software, restrictors.

The offered accessories and sets are meant to assist your evaluation process. After the feasibility of the micropump in the customer specific application has been proven, an adequate miniaturization of the controller and the equipment can be carried out.

The design of customized controllers is part of the services offered by Bartels microEngineering.

Please contact us, so that we can support you in choosing the suitable equipment.

All values are approximate and no guarantee of specific technical properties.

Changes in the course of technical progress are possible without notice.

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