

Bartels Micropumps

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

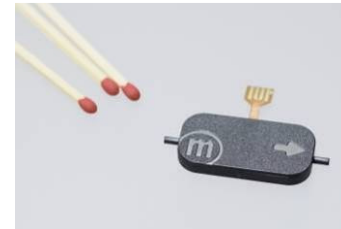
In many sectors they have become indispensable. Dosing lubricants, feeding sensors with sample gas or mixing starch into the steam of flat irons are only a few of the manifold tasks they can fulfill. Many further fields of application for example are located in medical technologies and analytics.

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 may well be used as disposables.

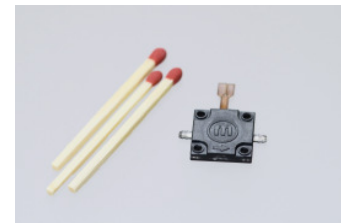
The functional principle of the Bartels micropumps is based on a piezoelectric diaphragm in combination with passive check valves. A piezo ceramic mounted on a coated brass membrane is deformed when voltage is applied. By the resulting down stroke, the medium is being displaced out of the pump chamber below. The check valves on both sides of the pump chamber define the flow direction. When the voltage decreases, the piezos correspondent 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 and the correspondent 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.

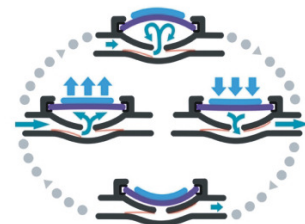
Once the perfect pump for your application has been found, you may purchase an exclusive production license for this version to include the component into your own production processes. Of course Bartels microComponents can also realize a high quality serial production for you at low cost.



mp6 – the small power pack.



mp5 – small, smart and low in price.



Functional principle.

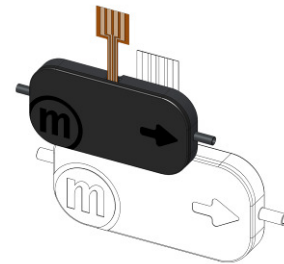


mp6 Micropump

The Bartels micropump mp6 combines two piezo actuators inside a single housing. The new pump 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 problems.

In the entire pump only one material gets into contact with the medium: all relevant parts are made of PPSU. Low prices in large quantities due to an automated assembly and low power consumption are further advantages of the mp6.

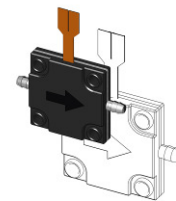


mp5 Micropump

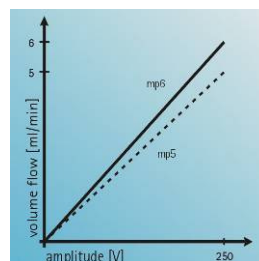
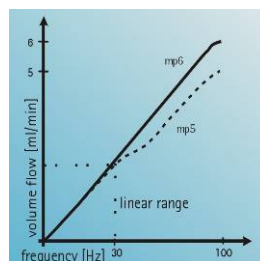
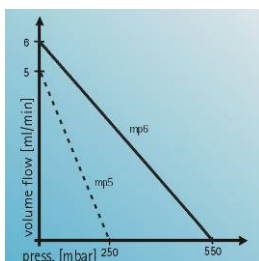
The mp5 from Bartels microComponents is the smallest and lightest micropump available.

Since 2004 the mp5 has successfully shown the potential of piezo membrane pumps. Due to the limited bubble tolerance and higher price in medium quantities, it is now replaced by its successor the mp6 in many applications. If size is a challenging factor, then the mp5 is still the right choice.

Its low power consumption and tiny size makes the mp5 the perfect pump to be fully integrated into your product's design. Test the mp5 now and ask about the possibilities of a customer specific adaptation - for your individual micropump.

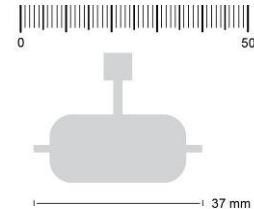


Typical characteristics of the Bartels micropumps:



Technical Data of the mp6 ¹

mp6	Order code: mp6	
Pump type	piezoelectric diaphragm pump	
Number of actuators	2	
Dimensions without connectors	30 x 15 x 3.8 mm ³	
Weight	2 g	
Fluidic connectors	tube clip (outer diameter 1.6 mm, length 3.5 mm)	
Electric connector	flex connector / Molex FCC 1.25 mm pitch	
Power consumption	< 200 mW	
Self-priming	yes ²	
Pumping media	liquids, gases and mixtures	
Operating temperature	0 – 70°C	
Life time	5000 h ³	
IP code	IP33 ⁴	
Materials in contact with media	polyphenylene sulphone (PPSU)	
Suitable evaluation controller	mp-x and mp6-OEM	
Typical values of flow and back pressure for selected media (values defined with mp-x: 250 V, SRS):		
Gases	Max. flow	18 ml/min (300 Hz)
	Max. back pressure	100 mbar (300 Hz)
Liquids	Water	
	Max. flow	6 ml/min +/- 15% (100 Hz)
	Max. back pressure	550 mbar +/- 15% (100 Hz)



¹ Typical values. Values can vary under application conditions. Content is subject to changes without notice.

² Conditions: suction pressure < 10 mbar, DI water, settings mp-x: 100 Hz, 250 V, SRS, the max. flow rate will be reached after a few minutes of operation time.

³ Conditions: DI water, room temperature, settings mp-x: 100 Hz, 250 V, SRS.

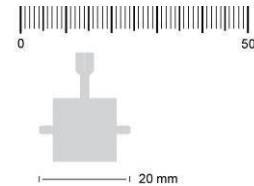
⁴ Can be changed to IP44.

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



Technical Data of the mp5¹

mp5	Order code: mp5	
Pump type	piezoelectric diaphragm pump	
Number of actuators	1	
Dimensions without connectors	14 x 14 x 3.5 mm ³	
Weight	0.8 g	
Fluidic connectors	tube clip (outer diameter 2 mm, length 3 mm)	
Electric connector	flex connector / phone jack	
Power consumption	< 200 mW	
Self-priming	yes ²	
Pumping media	liquids or gases	
Operating temperature	0 – 70°C	
Life time	5000 h ³	
IP code	IP44	
Materials in contact with media	polyphenylene sulphone (PPSU), polyimide (PI), nitrile butadiene rubber (NBR)	
Suitable evaluation controller	mp-x and mp5-a	
Typical values of flow and back pressure for selected media (values defined with mp-x: 250 V, SRS):		
Gases	Max. flow	15 ml/min (300 Hz)
	Linear range	0 – 5 ml/min @ 0 – 50 Hz
	Max. back pressure	30 mbar (300 Hz)
Liquids	Water	
	Max. flow	5 ml/min (100 Hz)
	Linear range	0 – 3 ml/min @ 0 – 30 Hz
	Max. back pressure	250 mbar (100 Hz)
Repeatability (30 Hz, 250 V, SRS)	< 12 %	
Viscosity	<~ 120 mPas	



¹ Typical values. Values can vary under application conditions. Content is subject to changes without notice.

² Conditions: suction pressure < 10 mbar, DI water, settings mp-x: 100 Hz, 250 V, SRS, the max. flow rate can be reached by manual priming.

³ Conditions: DI water, room temperature, settings mp-x: 100 Hz, 250 V, SRS.

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

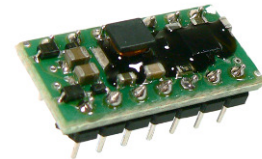


Equipment for the Bartels Micropumps

mp-x controller	Order code: mp-x
Access to the full range of driving parameters. A system for the professional evaluation of the micropumps mp5 or mp6.	
Dimensions	approx. 7.5 x 16 x 20 cm ³
Pumping media	liquids or gases
Adjustable parameters	amplitude/frequency/signal form
Amplitude range	0 - 250 V
Frequency range	0 - 300 Hz
Signal form	sine, rectangular, SRS
Power supply	mains adaptor
Current consumption	500 mA at 7.5V
Max. flow rate for water (typ.)	6 ml/min (DI-water, SRS, 250 V, 100 Hz)
USB-Port incl. Driver	setting parameters via the PC of the user
Pump connectors	for 1 - 2 mp5 or one mp6

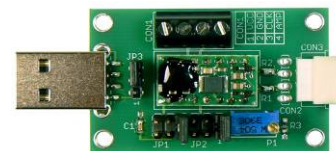


mp-x



mp6-OEM

mp6-OEM controller	Order code: mp6-OEM
The controller drives the mp6 at adjustable performance in a package similar to an integrated circuit. It enables integration of a small pump driver into the system electronics or on a PCB.	
Dimensions	1.05 x 2.05 x 0.90 cm ³
Pumping media	liquids or gases
Adjustable parameters	amplitude / frequency
Amplitude range	100 - 235 V
Frequency	25 - 120 Hz
Signal form	similar to rectangular
Power supply	2.5 V- 5 V DC
Current consumption	approx. 40 mA at 3 V
Max. flow rate for water (typ.)	4.5 ml/min



mp6-EVA

mp6-EVA evaluation board	Order code: mp6-EVA
The evaluation board enables the simple use of the mp6-OEM controller. Next to preset standard parameter (235 Vpp, 100 Hz) the mp6-EVA also allows to adjust the pump parameters, partly by external tuning. As 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.	
Dimensions	6.5 x 3 x 2 cm ³
Pumping media	liquids or gases
Adjustable parameters	amplitude / frequency
Amplitude range	100 - 235 V
Frequency	25 - 120 Hz
Signal form	similar to rectangular
Power supply	USB; 2.5 V- 5 V DC
Current consumption	approx. 40 mA at 3 V
Max. flow rate for water (typ.)	4.5 ml/min

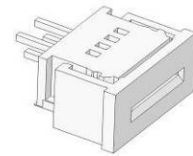


mp6-con connection cable	Order code: mp6-con
Connector for mp6 to mp-x	
Molex FCC 1.25 mm pitch, 85 cm cable, Binder 620 connector	



mp6-con

mp6-mol connector	Order code: mp6-mol
Connector to micropump mp6, for custom made cabling	
Molex FCC 39532045 1.25 mm pitch 1 packaging unit = 10 pieces	



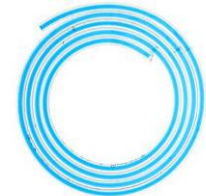
mp6-mol

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 span width)
Materials in contact with the pumped media	silicone, stainless steel
Fluidic connectors	tube clip inner diameter: 1.6 mm length: 5.6 mm
Cracking pressure	typical < 35 mbar
Max. back pressure	500 mbar
Typical leak rate	< 20 µl/h for liquids (500 mbar)



mp-cv

mp-t tubing	Order code: mp-t
Inlet/outlet compatible Tygon® tubing	
Inner diameter	1.3 mm



mp-t

mp-y tubing connector	Order code: mp-y
Y-connector for tubing, for the parallel use of two micropumps:	
Material	poly propylene (PP)
for tubing diameters of	1.3 – 2.6 mm



mp-y



Sets:

mp5-go! Set	Order code: mp5-go!
The evaluation of the mp5 can be started directly with this set. It contains:	
3 micropumps mp5	
1 mp-x controller	
1 meter mp-t tubing	

mp6-go! Set	Order code: mp6-go!
The evaluation of the mp6 can be started directly with this set. It contains:	
3 micropumps mp6	
1 mp-x controller including connection cable for 1 mp6	
1 meter mp-t tubing	

mp6-basic Set	Order code: mp6-basic
The evaluation of the mp6 can be started directly with this set. It contains:	
3 micropumps mp6	
1 mp6-EVA evaluation board	
1 meter mp-t tubing	

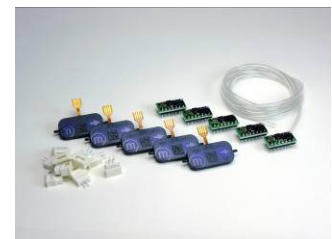
mp6-pro Set	Order code: mp6-pro
The evaluation of the mp6 can be started directly on the customer's circuit board with this set. It contains:	
5 micropumps mp6	
5 mp6-OEM controller	
1 mp6-mol connector	
1 meter mp-t tubing	



mp6-go! Set



mp6-basic Set



mp6-pro Set

The offered equipment is meant to assist your evaluation process. After the feasibility of the micropump in the customer specific application is proved, an adequate miniaturization of the controller and the equipment can be carried out. The design of a customer specific controller is part of the services offered by Bartels microComponents.

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

