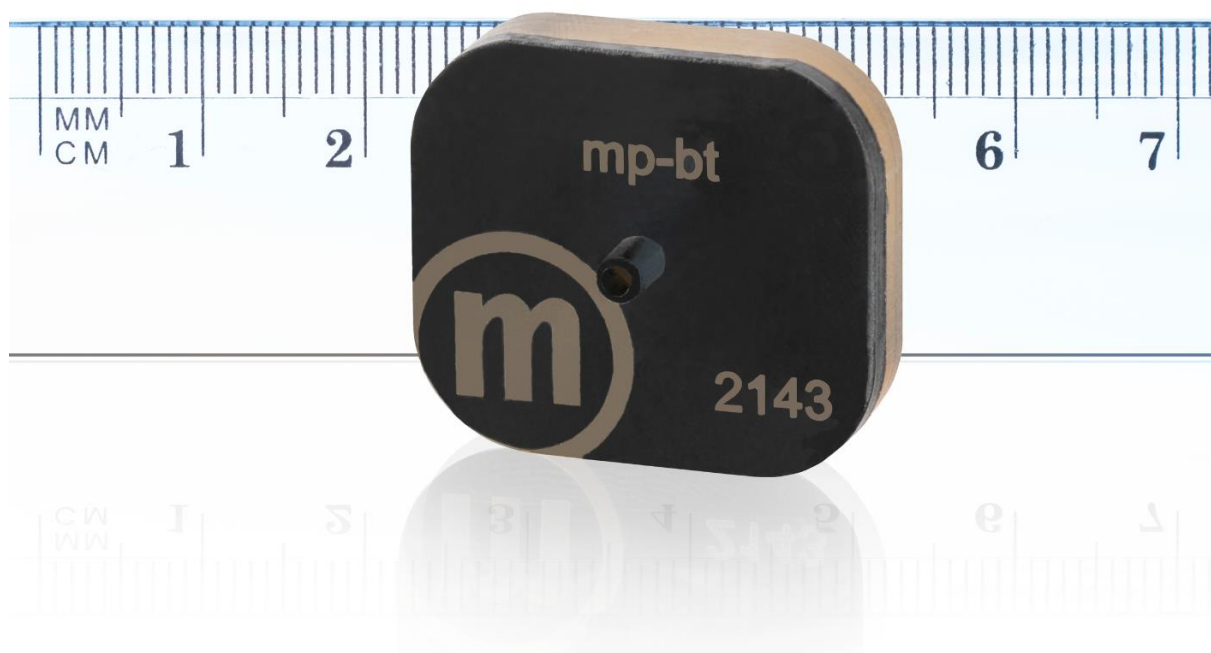


Catalogue mp6 accessories



Summary

This catalogue deals with pre-selected, reasonable accessories adding features to the mp6 micropump.

Our microfluidic equipment enables the full functionality of the mp6 micropump.

That is why – besides the different micropumps – we also offer microfluidic equipment like bubble traps, hoses, hose clamps, manifolds, and much more. With the help of these components, you can build up your microfluidic system quickly and easily.

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1 Revision History

Changes from v1.2 to v1.3

- New chapter: 1 Revision History added
- New sub chapter: 2.10 Memetis 2/2-way bistable valve
- Wetted Materials in 2.3.2 updated
- Wetted Material in 2.9 updated
- Fluidic connectors added in 2.9
- Compatible drivers in 2.9 updated

Changes from v1.3 to v1.4

- New sub chapter: 2.5 Reservoir Bundle

Changes from v1.4 to v1.5

- New sub chapter: mp-s

Changes from v1.5 to v1.6

- New sub chapter: Microfluidic Chip by Micronit

Changes from v1.6 to v1.7

- New sub chapter: Gasflow Sensor by Sensirion
- Photo added for sub chapter 2.17

Changes from v1.7 to v1.8

- New sub chapter: Festo 3/2-way solenoid valve (not media separated)
- New sub chapter: Bürkert 3/2-way solenoid valve (media separated)
- Chapter Warning, Personal Injury: Paragraph 4 extended
- Correction: several order codes
- Extended: Internal volume for mp-damper

Changes from v1.8 to v1.9

- Grammar mistakes corrected

Changes from v1.9 to v1.10

- New sub chapters: VOC- & CO2 Sensor

Changes from v1.10 to v1.11

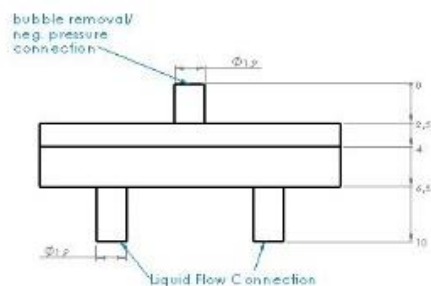
- Important Notice in 2.15 added

2 mp6 series accessories

2.1 Bubble Trap mp-bt

A bubble trap to get rid of bubbles in your flow stream.

Dimensions



Technical specification:

mp-bt	Order code: mp-bt
Dimensions	17 x 19 x 10 mm
Material	PPSU, PET
Media	Water based solutions
ports	Ø 1,9mm suitable for 1,3mm mp-t
Internal volume	100 µl
Water Entry Pressure:	1,9 bar
Necessary neg. pressure	100 – 200 mbar
Necessary accessories	mp6 @ 250Vpp/300Hz

2.2 Filter mp-f

Depending on the particulate matter, the particle load has an influence on the performance of the micropump. The higher the load the larger the probability of clogging and blockage of the fluid channels. This can lead to a decline until stagnation of the flow rate of the micropump. We recommend only to pump liquids with a particle size smaller than 50 µm. We recommend the use of filters if you are pumping media that has a particulate load.

Technical specifications:

mp-filter liquid filter	Order code: mp-f
Dimensions	21 mm x 5.5 mm (length x wrench size) 0.82677 in. x 0.2165 in.
Wetted material	PP, PPSU, DELO AD840
Fluidic connectors	barbed tube clip, length : 5.6 mm for tubing with internal diameter: 1.3 mm
Filter porosity	20 – 60 µm



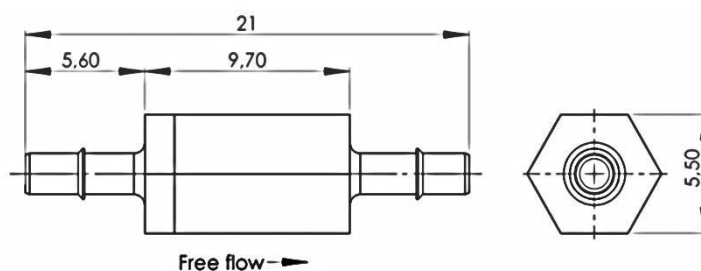
2.3 Passive Check Valves

When the micropump is switched off, a back flow of the pumping medium, depending on a differential pressure between in- and outlet is possible. In order to impede a back-flow Bartels Mikrotechnik offers a passive check valve integrated in stainless steel.

The connection of the valves with the micropump can be done easily with suitable tubing. The valve should be placed between the micropump and the outlet reservoir. The valves are individually marked regarding the free flow direction. Please note that the volume flow of the micropump will be influenced by the check valve.

2.3.1 mp-cv

Dimensions:



Technical specifications:

mp-cv check valve	Order code: mp-cv
-------------------	-------------------

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)

2.3.2 sm-cv

sm-cv check valve	Order code: sm-cv
Barbed	1/16"
Wetted Material	Polypropylene, Viton, Stainless Steel
Opening pressure	0.09 PSI



2.4 Pulsation Damper mp-Damper

This damper is designed to reduce the pulsation of fluids from micropumps to allow sensors to measure more reliable. For example, calorimetric flow sensors.

Technical specification:

mp-damper pulsation damper	Order code : mp-damper
Material	PPSU (black/transparent), silicone
Dimensions	17 x 19 x5 mm
Number of in-/ outlets	2
In-/ outlet inner diameter	1,4 mm
In-/ outlet outer diameter	1,6 mm
Internal volume	133 µl
Operating temperature	+5°C up to 45°C
Wetted material	PPSU, silicone



2.5 Reservoir Bundle

This bundle is equipped with components realizing direct flow (i.e. closed-loop) and indirect flow (i.e. pressure driven flow) applications. It can also be utilized as a damping volume for gas application minimizing pulsation in combination with gas flow meters.

Reservoir Bundle	Order code : Reservoir
Included components	Vial, closure w/hole & septum, short dosing tip, long dosing tip, Male Luer to Barb connector (2x)
Dimensions vial	22.5 mm x 46 mm
Dimensions short dosing tip	ID : 1.6 mm, OD : 1.83 mm, Length : 38 mm
Dimensions long dosing tip	ID : 1 mm, OD : 1.4 mm, Length : 50 mm
Male Luer to Barb connector	OD Barb : 1/16 inch
Operating temperature	< 100°C
Wetted material	glass, stainless steel, PTFE, Silicone, metal (magnetic), PP



2.6 Tubing connector mp-y

The y-connector is suitable for a parallel operation of two micropumps.

Technical specifications:

mp-y tubing connector	Order code: mp-y
Material	polypropylene (PP)
for tubing inner diameters of	1.3 – 2.6 mm 0.512 – 0.1024 in.



2.7 Tygon Tubing mp-t

The mp-t is a tube made of Tygon material that is compatible with the inlet and outlet of the micropump. The tube is available in two versions.

Technical specifications:

mp-t tubing	Order code: mp-t ID 1.3 mm	Order code: mp-t ID 1.02 mm
Inner diameter	1.3 mm	1.02 mm
Outer diameter	3 mm	2.74 mm
Wall thickness	0.85 mm	
Sterilizable	Yes (autoclave or ethylene oxide)	
Color	transparent	
Packaging unit	1 m	
Suitable micropumps	mp6-liq, mp6-gas, mp6-gas+	



2.8 Silicone Tubing mp-s

The mp-s is a tube made of silicone material that is compatible with the inlet and outlet of the micropump.

Technical specifications:

mp-s tubing	Order code: mp-s
Inner diameter	1 mm
Outer diameter	3 mm
Wall thickness	1 mm
Sterilizable	Yes (autoclave or ethylene oxide)
Color	Transparent/turbid



2.9 Hose Clamp mp-hc

The hose clamp mp-hc serves as a connector aiding the micropump functionality at high pressure applications, by preventing leakage at the micropumps fluidic connectors.

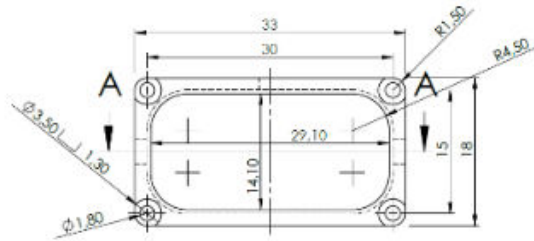
mp-hc host clamps	Order code : mp-hc
Material	PPSU
Dimensions in close state	4 x 5,1 x 2 mm (width in tube direction)
Inner diameter (closed)	3 mm



2.10 Mounting frame mp-mf

This frame helps to mount the micropump mp6 via screws.

Dimensions:



Technical specification:

mp-mf	Order code: mp-mf
Dimensions	33 x 18 x 4 mm
Material	PLA, blue
Suitable screw	M1,6

2.11 Takasago 2/2-way normally-closed valve

An almost silent and low power active valve from the company Takasago. We cooperate with the German representative BMT.

Technical specification:

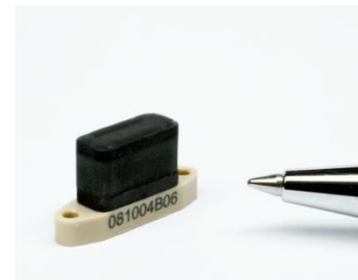
Active valve	Order code : Active valve
Valve type	2/2-way valve – normally closed
Model number	SMV-2R-AN1F
Dimensions	4 x 18,4 x 19 mm 0,62x 1,57 x 0,06 in.
Operating temperature range	5 – 40°C
Material	FPM, PPS
Input current	250 mA
Switching time	600ms
Power consumption	0,3 W
Compatible driver	mp-valvedriverT
Fluidic Connectors	1.6 mm barb connectors
For more information please check the data sheet of the manufacturer Takasago, which is available at https://www.pumps-valves.eu/	



2.12 Memetis 2/2-way bistable valve

An almost silent and low power active valve on a very small footprint from the company Memetis. It does not consume any power within the switching states.

Active valve	Order code : Bistable (BV1101)
Valve type	2/2-way valve – bistable
Model number	BV1101
Dimensions	20 x 5 x 10.1 mm ³
Operating temperature range	10 – 50°C
Material	Silicone, PEEK
Input current	500 mA
Switching time	40 or 130 ms
Energy per switching	75 mJ
Compatible driver	mp-valvedriverM
Fluidic Connectors	1.6 mm barb connectors
For more information please check the data sheet of the manufacturer Memetis, which is available at https://www.memetis.com	



2.13 Festo 3/2-way solenoid valve (not media separated)

Fast switching 3/2-way solenoid valve from the company Festo that is not media separated.

Active valve	Order code: Festo solenoid valve
Valve type	3/2-way valve – normally closed (not media separated)
Model number	VOVK
Dimensions	6 x 42.8 x 15.5 mm ³
Operating temperature range	5 – 50°C
Material	PBT, Steel
Power consumption	0.5 W
Switching time	<13 ms
Input voltage	12 V
Compatible driver	mp-valvedriverS
Fluidic Connectors	1.5 mm barb connectors
For more information please check the data sheet of the manufacturer Festo, which is available at www.festo.com	



2.14 Bürkert 3/2-way solenoid valve (media separated)

Fast switching media separated 3/2-way solenoid valve from the company Bürkert.

Active valve	Order code : Bürkert solenoid valve
Valve type	3/2-way valve – normally closed (media separated)
Model number	Typ 6724
Dimensions	9 x 44.8 x 40 mm ³
Operating temperature range	5 – 50°C
Material	EPDM, PEEK
Power consumption	1 W
Switching time	Ca. 3 ms
Input voltage	12 V
Compatible driver	mp-valvedriverS
Fluidic Connectors	2 mm barb connectors
For more information please check the data sheet of the manufacturer Festo, which is available at www.buerkert.de	



2.15 Liquid Flow Sensors SLF3s-0600F & -1300F by Sensirion

Sensors from the SLF3x series by Sensirion are thermal flow sensors measuring the liquid flow rate of the pump.

Technical specification:

Liquid Flow Sensor	Order code : Sensor SLF3S-0600F or SLF3S-1300F
Dimensions	48 x 15.5 x 8.9 mm ³
Liquid Flow sensing	up to ±2000 µl/min (SLF3S-0600F) up to ±40 ml/min (SLF3S-1300F)
Wetted materials:	PPS, stainless steel 316L, epoxy-based adhesive
Important notice	Biofilm can form from use and contamination on the sensor element, causing inaccurate measurements. Prevent with IPA rinses after every use and remove with an enzymatic solution. Not covered under warranty.
More information in the data sheet from the manufacturer Sensirion at https://sensirion.com/	



2.16 Gas Flow Sensor by Sensirion

Sensors from the SDP81x series by Sensirion are thermal flow sensors measuring the air flow rate of the pump.

Technical specification:

Gas Flow Sensor	Order code : Gasflow Sensor
Dimensions	29 x 10.25 x 18 mm ³
Air Flow sensing	1 – 50 ml/min
Calibrated for	Air, N ₂
Wetted materials:	PBT (polybutylene terephthalate), glass (silicon nitride, silicon oxide), silicon, gold, FR4, silicone as static sealing, epoxy, copper alloy, lead-free solder
Allowable overpressure	1 bar
More information in the data sheet from the manufacturer Sensirion at https://sensirion.com/	



2.17 VOC Level Sensor by Sensirion

Sensor from the SGP4X series by Sensirion MOX sensors measuring the VOC Level of a gas phase.

Technical specification:

Gas Flow Sensor	Order code : VOC Level Sensor
Dimensions	30 x 30 x 15,3 mm ³
Supply Voltage	5V
Measuring Range VOC	0 – 65535 ticks
Measuring Range NOX	0 – 65535 ticks
Interface	I ² C
Allowable overpressure	1 bar
More information in the data sheet from the manufacturer Sensirion at https://sensirion.com/	

2.18 CO2 Level Sensor by Sensirion

Sensor from the SCD4X series by Sensirion are high accuracy sensors measuring CO2 levels in a gas phase

Technical specification:

Gas Flow Sensor	Order code : CO2 Level Sensor
Dimensions	29 x 10.25 x 18 mm ³
Supply Voltage	5V
Measuring Range	400 – 5000 ppm
Interface	I ² C
Allowable overpressure	1 bar
More information in the data sheet from the manufacturer Sensirion at https://sensirion.com/	

2.19 Preassembled Pressure Sensor by Honeywell

The pressure sensors from the ABP series by Honeywell offer an easy-to-use solution measuring pressure in liquid and gas systems.

Preassembled pressure sensor	Order code : ABP pressure sensor
Dimensions	8 mm x 7 mm
Pressure range	Up to 15 psi
Measures gage pressure	
More information in the data sheet from the manufacturer Honeywell available at https://www.honeywell.com/us/en	



2.20 Microfluidic Chips by microfluidic ChipShop

Plastic chips with internal fluidic structures helping to realize experiments on a very small footprint.

Technical specification:

Microfluidic Chips:	Chip with 16 straight channels	Chip with 7 reaction chamber	Reaction chamber chip with 8 different depths
Width	1000 µm	-	-
Length	18 mm	-	-
Depth	200 µm	370 µm	100 – 800 µm
Volume	3.6 µl	6.66 µl	1.8 – 14.4 µl
Fluidic interface	Mini Luer		
Material	Topas		
More information in the data sheet from the manufacturer microfluidic ChipShop available at https://www.microfluidic-chipshop.com/			



2.21 Microfluidic Chips by Micronit

Glass chips with internal fluidic structures helping to realize experiments on a very small footprint.

Technical specification:

Microfluidic Chip (3 Channels):	Channel A	Channel B	Channel C
Width	500 µm	1500 µm	1000 µm
Length	42 mm	40 mm	42 mm
Depth	50 µm	50 µm	50 µm
Volume	1 µl	2.8 µl	1.9 µl
Fluidic interface	External equipment necessary (Chip holder & connection kit)		
Material	Glass (D263 Bio)		
More information in the data sheet from the manufacturer Micronit available at https://www.micronit.com/			

2.22 mp6-con cable for mp-Labtronix

mp6-con connection cable	Order code: mp6-con
Design and connectors	<ul style="list-style-type: none"> - Molex FCC 1.25 mm pitch - 85 cm (33.465 in.) cable - Binder 620 connector



2.23 mp6-mol connector

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



3 Important Notices

This operating manual contains necessary instructions for the installation, commissioning, operation and maintenance of the mp6-series. The manual is intended to help you achieving optimal results in a short time and shall also assist avoiding possible sources of errors. The operating manual of the controllers and the accessories are available separately.

The products have been designed with state-of-the-art technology and in accordance with all relevant safety regulations. However, a risk of damage to the units, other property, the operator and/or other persons cannot be fully excluded.

Always ensure that specialized and trained personnel will comply with the following general instructions. Therefore, please keep this manual and hand out copies as required.

All values are approximate and no guarantee of specific technical properties.
Changes in the course of technical progress are possible without notice.

3.1 Warranty

The mp6 micropumps have been developed for the transport of gases or liquids. The controllers have been developed for operating the mp6 micropumps. Bartels Mikrotechnik can assume no liability for damages resulting from the pump media. This applies especially for hazardous fluids.

The mp6 micropumps must be operated with Bartels Mikrotechnik electronics. Bartels Mikrotechnik GmbH cannot guarantee the proper work of the units with customer specific electronics. If other controllers than the ones from Bartels Mikrotechnik are used, Bartels Mikrotechnik disclaims any warranty.

Bartels Mikrotechnik assumes no liability for abnormal handling, improper or negligent use of the mp6 micropumps and the controller that is not conform to the specified purpose of the system. This applies especially for micropump controllers, components and systems of other manufacturers, which have not been certified by Bartels Mikrotechnik.

We guarantee that the mp6 micropumps comply with the actual state of scientific and technical knowledge and due to this, the operational risks are limited to a minimum.

Bartels Mikrotechnik GmbH warrants solely to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product shall be of the quality, material and workmanship defined in Bartels Mikrotechnik GmbH published specifications of the product. Within such period, if proven to be defective, Bartels Mikrotechnik GmbH shall repair and/or replace this product, in Bartels Mikrotechnik GmbH's discretion, free of charge to the Buyer, provided that:

- notice in writing describing the defects shall be given to Bartels Mikrotechnik GmbH within fourteen (14) days after their appearance
- such defects shall be found, to Bartels Mikrotechnik GmbH's reasonable satisfaction, to have arisen from Bartels Mikrotechnik GmbH's faulty design, material or workmanship
- the defective product shall be returned to Bartels Mikrotechnik's factory at the Buyer's expense
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

This warranty does not apply to any equipment which has not been installed and used within the specifications recommended by Bartels Mikrotechnik GmbH for the intended and proper use of the equipment.

EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH HEREIN, Bartels Mikrotechnik GmbH MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE PRODUCT. ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED AND DECLINED. Bartels Mikrotechnik GmbH is only liable for defects of this product arising under the conditions of operation provided for in the data sheet and proper use of the goods. Bartels Mikrotechnik GmbH explicitly disclaims all warranties, express or implied, for any period during which the goods are operated or stored not in accordance with the technical specifications. Bartels Mikrotechnik GmbH does not assume any liability arising out of any application or use of any product or circuit and specifically disclaims any and all liability, including without limitation consequential or incidental damages. All operating parameters, including without limitation recommended parameters, must be validated for each customer's applications by customer's technical experts. Recommended parameters can and do vary in different applications. Bartels Mikrotechnik GmbH reserves the right, without further notice, (i) to change the product specifications and/or the information in this document and (ii) to improve reliability, functions and design of this product.

3.2 Warning, Personal Injury

Bartels Mikrotechnik GmbH rejects any responsibility for damages to persons or property resulting from non-compliance with the instructions in this manual. In this case all warranties shall be void.

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury. If the Buyer shall purchase or use Bartels Mikrotechnik GmbH products for any unintended or unauthorized application, Buyer shall defend, indemnify and hold harmless Bartels Mikrotechnik GmbH and its officers, employees, subsidiaries, affiliates and distributors against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if Bartels Mikrotechnik GmbH shall be allegedly negligent with respect to the design or the manufacture of the product.

Moreover, please note that components of the controller and pump are operating with high voltage. Therefore, persons wearing pacemakers are recommended to avoid the operating system. Do not open the housing of the micropump and the controllers.

The use of liquids, which may alone or in combination create explosive or otherwise health-endangering conditions (including vapors) is not permitted.

All work in connection with the installation, assembly, commissioning/decommissioning, disassembly, operation, servicing, cleaning and repairing of the pump and the controller must be carried out by qualified, suitably trained and instructed personnel. Work on electrical components and assemblies must be carried out by supervised personnel with the necessary qualifications and skills, after verifying that the components do not lead residual voltage or charge and in a dry environment.

We guarantee that the micropumps comply with the actual state of scientific and technical knowledge and due to this, the operational risks are limited to a minimum.

ESD Precautions: The inherent design of the active electronic components, i.e. mp-Lowdriver, -Highdriver, -Highdriver4, Valvedriver and -Labtronix causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product.

4 Company information



Bartels Mikrotechnik is a globally active manufacturer and development service provider in the field of microfluidics. In the microEngineering division, the company supports industrial customers in the modification, adaptation and new development of high-performance and market-oriented product solutions through the innovative means of microsystems technology. The second division, microComponents, produces and distributes microfluidic products and systems, especially for miniaturized and portable applications. Our key products are micropumps that convey smallest quantities of gases or liquids and are used in a variety of ways in biotechnology, pharmaceuticals, medical technology and numerous other applications.

Bartels Mikrotechnik with passion for microfluidics!

Contact us:

Bartels Mikrotechnik GmbH
Konrad-Adenauer-Allee 11
44263 Dortmund Germany

www.bartels-mikrotechnik.de
info@bartels-mikrotechnik.de
Tel: +49-231-47730-500

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