

microComponents <sup>m</sup>

# mpSmart-Flowstop



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## General

This operating manual contains all necessary instructions for the installation, commissioning, operation and maintenance of the evaluation board mpSmart-Flowstop controller. The manual is intended to help you achieving optimal results in a short time and shall assist avoiding possible sources of errors. The operating manual of the micropumps and other controllers 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.

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.

### Declaration of conformity.

Bartels Mikrotechnik GmbH declares that the products are compliant to the RoHS directive 2011/65/EU. The controller complies with the requirements of EMV 2014/30/EU and CE markings have been affixed to the devices. Additionally, the controllers are also compliant to the EU Low Voltage Directive 2014/35/EU.

### Description of function.

The mpSmart-Flowstop have been developed for the transport of liquids. The controller has been developed for operating the micropump. Bartels Mikrotechnik can assume no liability for damages resulting from the pump media. This applies especially for hazardous fluids.

The pump 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.

**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.

Bartels Mikrotechnik assumes no liability for abnormal handling, improper or negligent use of the micropump 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 micropumps comply with the actual state of scientific and technical knowledge and due to this, the operational risks are limited to a minimum.

**Do not open the housing of the micropump and the controllers.** In those cases, Bartels Mikrotechnik cannot issue a guaranty anymore. Please keep this manual safe and give a copy to all users.



## Proper use

### Intended purpose.

The micropump is intended for pumping liquids with varying flow rates controlled by the electronics. The controllers are intended for operating the micropumps. Any other use of the micropump or controller unit is deemed improper.

Do not make any modifications or extensions to the pump or controller without the prior written consent of the manufacturer. Such modifications may impair the safety of the unit and are prohibited! Bartels Mikrotechnik GmbH rejects any responsibility for damage to the unit caused by unauthorized modifications to the pump and risk and liability are automatically transferred to the operator.

### Misuse.

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

### Staff selection and qualification.

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 personnel with the necessary qualifications and skills.

### About this operating manual.

Warnings and important notes are clearly identified as such in the text. The relevant text sections feature a specific sign. However, this icon cannot replace the safety instructions. Therefore, carefully read all safety instructions in this manual. Warnings and important notes in this text are highlighted as shown below, according to the severity of the damage that might result from non-compliance.

 **DANGER**

DANGER indicates a hazard with a high level of RISK THAT, if not avoided, will result in death or serious injury.



## The flowstop controlled system: mpSmart-Flowstop

This Flowstop System is controlling a mp6 micropump and a memory alloy valve via a PC software.	
Components	mp6 micropump Valve SMV-2R-BN1F of Takasago Tubing mpSmart-Flowstop control box
Flowrange	Controllable through amplitude and frequency
Pressure range	Up to 1 bar <sup>1</sup>
input voltage	5V USB
operating temperature	+5°C bis +40°C
material in contact with fluid	PPSU, FPM, PPS, Tygon
Lifetime (pump)	5000 h
self-priming	yes
dimensions (electronic board)	90x68x18 mm
weight (electronic board)	38 g
power consumption (maximum/stand by)	275 mW/ 60 mW
power supply	Via USB; 5 V
pumping media	Liquids and gases
Response time	600 ms

<sup>1</sup> Pressure range for the valve: At the inlet up to 1 bar, at the outlet up to 500 mbar

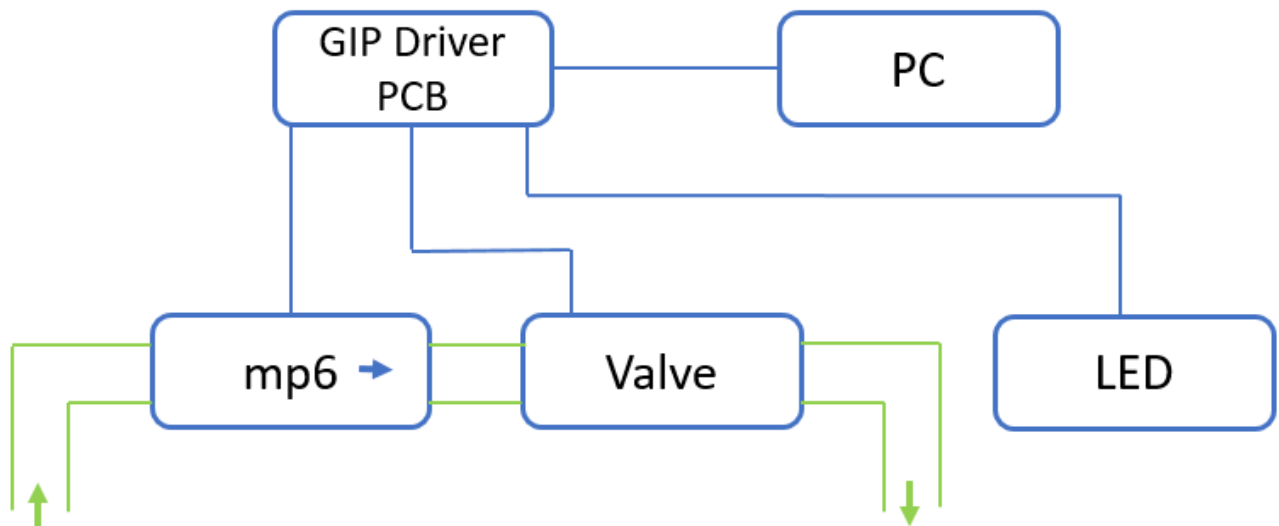


## Getting started with mpSmart-Flowstop

The mpSmart-Flowstop includes 2 main components:

A mp6 micropump and a valve SMV of the company Takasago.

For the fluid channel, connect them as shown in the following figure. Use tubes with an inner diameter of 1.3 mm for mp6 micropump inputs and outputs and for the valve. The valve requires one tube on each side. When the valve is open and allows air or water to pass through, the LED lights up. In the figure the green lines represent the fluid channel. The arrows mark the flow direction.



For the wiring, use the included cable to connect the mp6 micropump and valve to the Driver PCB and the USB cable to connect the Arduino on the Driver PCB with your PC.

## Software

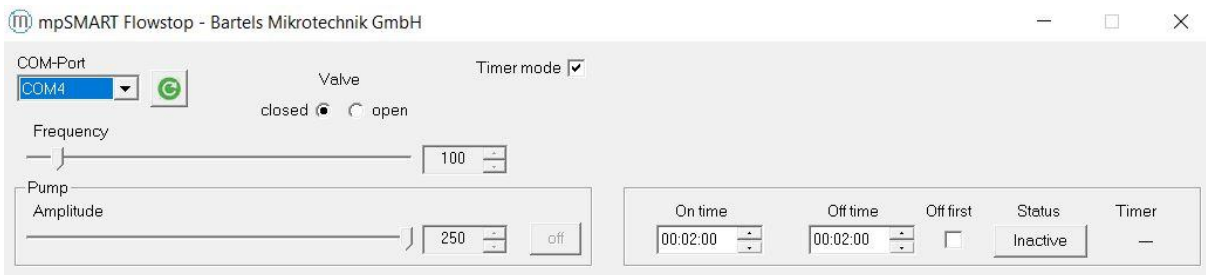
For the use of the mpSmart-Flowstop, the necessary application needs to be downloaded from the download section on our website: [www.bartels-mikrotechnik.de](http://www.bartels-mikrotechnik.de)

Executing the mpSmart-Flowstop App opens the following window.



Here you can regulate the pump parameters (frequency and amplitude) by using the sliders and you are able to switch the pump on and off. In addition you are able to open and close the valve manually.

Another option is the Timer mode.



Ticking the Timer mode box expands the window and you are able to set a timing mode for the micropump.

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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for further information on applications.

Tutorials and helpful answers to frequently asked questions can be found in our FAQ

<http://blog.bartels-mikrotechnik.de>

[www.bartels-mikrotechnik.de/produkte/faq](http://www.bartels-mikrotechnik.de/produkte/faq)

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