Application Note

Micropumps – Active Transport on Point-of-Care Platforms

Physio Check - passive Lab-on-a-chip-system for diagnostics

Micropump mp6

Micro system technology is a cross sectional technology, focusing on the miniaturization of technical components and devices. Nowadays it is increasingly applied in devices or technology platforms which are developed for medical diagnostics or drug development. Objective target are mobile point-of-care-(POC) systems with the aim of a near patient, decentralized and individualized diagnosis and therapy.

In such POC- systems for analysis, diagnostics or screening methods the typically required steps of sample preparation, assay technology and corresponding detection are brought together in a miniaturized format on microfluidic platforms. For all processes the handling of fluids is required.

Numerous approaches employ passive fluid control techniques like capillary forces. In some applications external actuation means are additionally used for a directed transport of the media. Examples are rotary drives applying centrifugal forces for the fluid transport on the passive chips. For more targeted processes on chip active transport systems come into play. Substantial components are integrated micropumps for the fluidic transport and micro valves to direct the flow. Here the piezo membrane micropumps from Bartels Mikrotechnik open up new fields of application. Due to their simple setup, they can be produced at a low cost level, are therefore applicable as disposable, and with their particle tolerance they prove performance under real conditions.

The micropump mp6 can provide a maximum flow rate of 6 ml/min with liquids and about 18 ml/min with gases. By using the available evaluation kit, the pump performance can be tested in the target application and driving parameters can be defined.

With its small dimensions, the pump can be used as a subassembly integrated on chip, being a part of the disposable. Optimal space-saving can be achieved by placing parts of the pump directly into

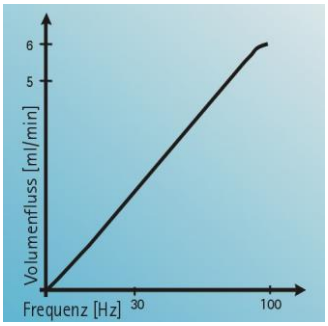
the injection molded parts of the fluidic chip. Depending on the disposable concept of the POC platform it is alternatively possible to integrate the micropump as an OEM component into the read-out unit.

POC analyzer platform ‚Genspeed'

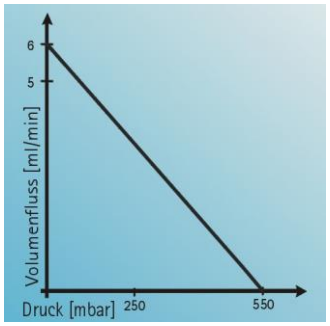
Especially for portable instruments, where miniaturization plays an important role, the low energy consumption of the micropumps becomes a relevant issue. Battery operation can be easily realized. Dependent on the customers need the driving electronics can be either integrated into the main PCB of the unit or even inside an enlarged pump housing.

In a concrete application example, the POC analyzer platform ‚Genspeed' (www.genspeed-biotech.com), liquid handling is realized via the micropump. This involved the automation of Genspeed, a system for the rapid diagnosis of hospital germs. Key components of Genspeed R2 include a microfluidic chip and a miniaturized automatic dispenser system based on multiple mp6-micropumps. The dispenser system should deliver various reagents with microliter accuracy into the inlet opening of the microfluidic chip, observing a precisely defined time and sequence. This method provides faster results than the established method of sending the sample to a laboratory.

Typical Characteristics:



Other POC developments which follow a direct integration of the micropump into the disposable are momentarily under evaluation. In case the standard micropumps are not able to fully cover the applications need, Bartels microComponents offers to develop tailor-made micropumps, system integration and the development of application specific controller.



Please find all the technical data in our "First information" or on our Website www.bartels-mikrotechnik.de.

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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Visit our Website

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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

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