

Application Note

Active Sensor Feeding with micropumps

Together with the request for higher safety and efficiency in industrial processes, the use of sensors increases continuously.

To generate stable and defined measurement values in these processes, the environmental conditions of the sensor need to be kept at a constant level. This especially applies to feeding the sensor with an analyte fluid. Besides a faster response to changing analyte properties, a lowered target concentration at the point of measurement can be balanced as applied for catalytic sensors for example.

As because of these reasons various sensors can not be used with completely passive feeding, micropumps from Bartels Mikrotechnik open up new fields of application. Due to their simple setup, they can be produced at a low cost level and with their particle tolerance they prove performance under real conditions.

With its small dimensions, the pump can either be used as a subassembly together with the sensor or as an OEM component to be integrated into a more complex unit. Especially for portable instruments, where miniaturization plays an important role, the low energy consumption comes into play. 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.

The use of an inert polymer in combination with an optimized placement of the pump inside the system enables operation also under difficult conditions.

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

In a customer application, the pump has been used to monitor a mixture of hydrogen, oxygen and nitrogen gas. Using a bypass channel, gas was extracted for analysis and fed to the sensor. During the system evaluation of the pump, characteristic flow rates in dependence on driving voltage and frequency have been determined, as shown in the first graph.

The second graph shows the dependency between the relative sensor signal and the gas flow. On the one hand this shows the signal improvement with active sensor feeding, on the other hand the need to provide a stable flow rate throughout the measurement.



Micropump mp6



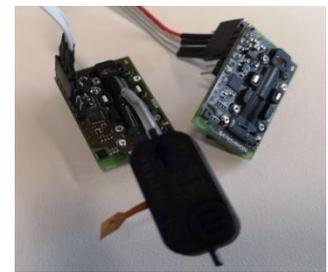
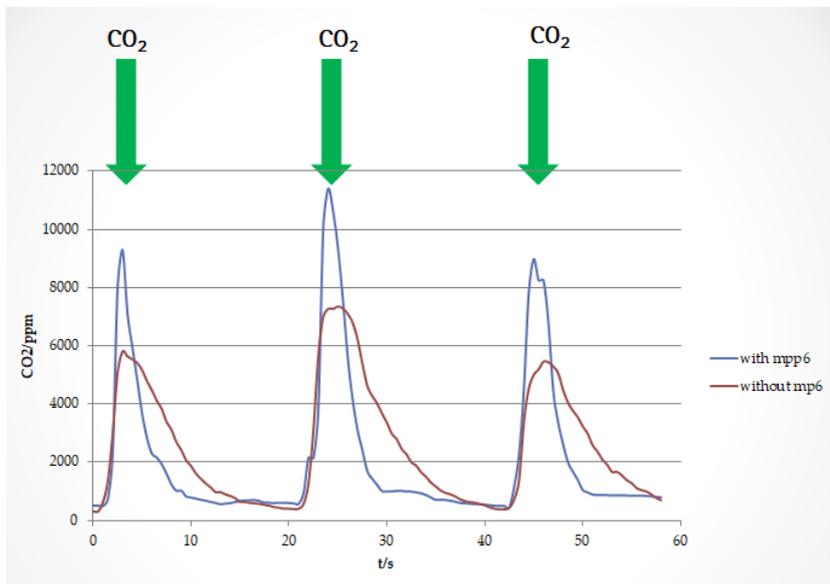
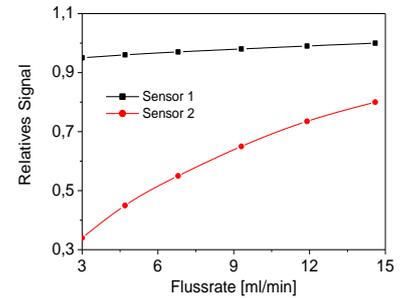
Micropump mp6



In a second application, a CO₂ gas sensor from the company Sensirion was directly exposed to a changing CO₂ concentration, once directly and once by using of an mp6 micropump.

The direct coupling of the test gas to the test beam slope of the IR sensor shows a significant improvement in the time response.

Besides standard components, Bartels microComponents is specialized in the development of application specific pumps and system integration



Micropump mp6 in set-up

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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