

TechNote

Bi-directional pumping with the mp6-series

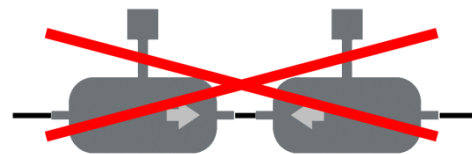
This TechNote describes the possibilities to achieve bi-directional flow with the mp6-series pumps.

In general the mp6-series pumps are not designed for and therefore not capable to pump in two directions, i.e. forwards and backwards. The passive valves inside the pump open only in one direction, which is the normal flow direction as marked with the arrow on top of the pump lid.

However, there are some pump combinations that will be able to achieve this goal of bi-directional pumping.

Combination of two pumps so that one pumps through the other one.

This is not a reasonable solution as the passive valves inside the inactive pump will omit the flow rate of the active pump. Although a certain leak flow exists, it will not be near any useful flow rate let alone any pressure generation.



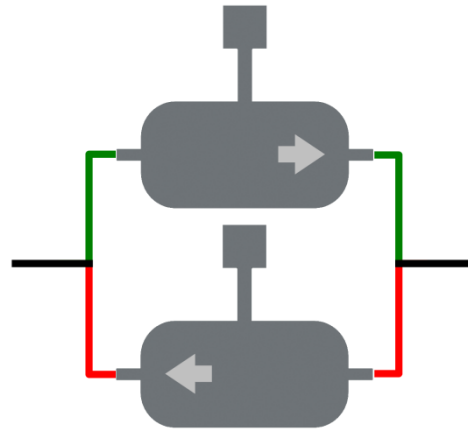
Combination of two pumps in parallel paths so that there is one pump for each direction.

If connected as shown in the picture, bi-directional pumping is possible but it is not an ideal solution. Although the inactive pump serves as a fluidic resistor to the flow of the active pump, a certain circular flow will happen through the inactive pump.

This circular flow will increase with the fluidic resistance of the adjacent fluidic system. Therefore if the flow out of this circle should be dominant, it will be necessary to increase the fluidic resistance of the circle lines.

Examples:

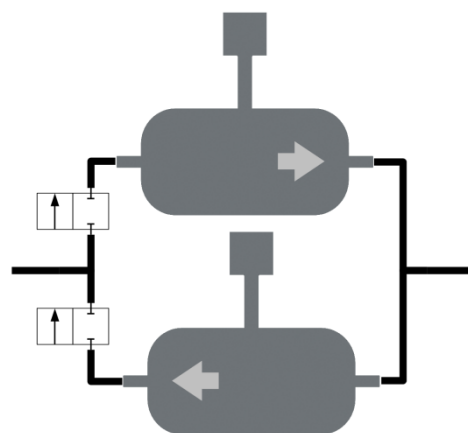
- Integrating a passive valve with a certain opening pressure into the passive pump line, that is higher than the pressure drop of the adjacent fluidic system the active pump should supply.
- Realizing the pump lines of the circle with lower diameter than the adjacent fluidic systems, to create higher resistance for the flow.



Combination of two pumps in parallel paths so that there is one pump for each direction. Two active 2/2 way valves allow to switch between directions.

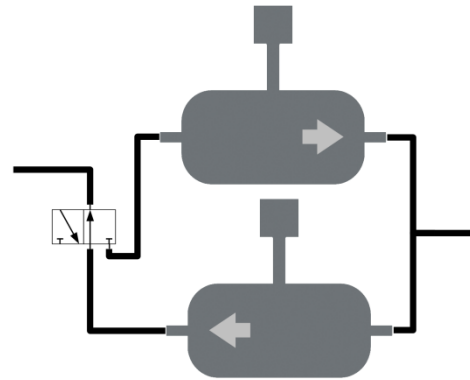
Each pump direction line requires an active valve that either blocks or allows flow.

The valve can be positioned upstream or downstream the pump and has to be opened together with the active valve.



Combination of two pumps in parallel paths so that there is one pump for each direction. One active 3/2 way valve allows to switch between directions.

The individual pump lines are connected to an active valve that can switch between the two paths. The valve can be positioned upstream or downstream the pump and has to be switched to the path of the active pump.



Currently, Bartels Mikrotechnik does not have active valves as standard products, although conceptual prototypes exist.

Bartels Mikrotechnik can assist with external engineering services supporting your micro valve customization. We can either offer to review your existing design for optimization or by a new development; fluidic system or micro valve.

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