

Mitos Fluika Control Valve

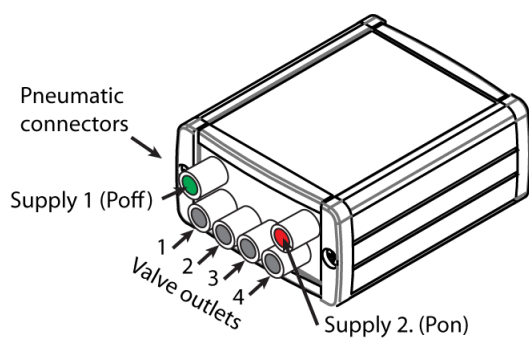


content	page
Product Description	2
Main Benefits and Applications	3
Performance	3
Dimensions	5
Control Commands	5
Product Specification	7

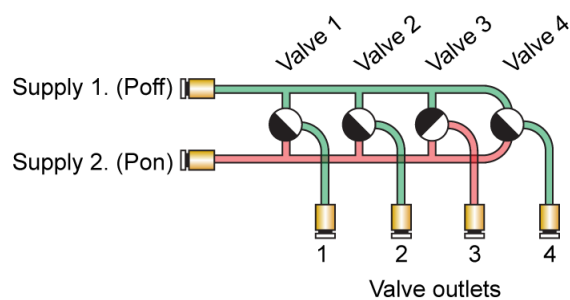
Part name	Part number
Mitos Fluika Control Valve	3200420

Product Description

The Mitos Fluika Control Valve contains four distributor valves to allow quick and timely switching between two different pressure sources. The device is easy to use and ultra-portable, powered and controlled through a USB port of a computer. Control-wise, it has a variety of functions, ranging from simple switching to the possibility to precisely time and synchronize valve actuation.



Outside view

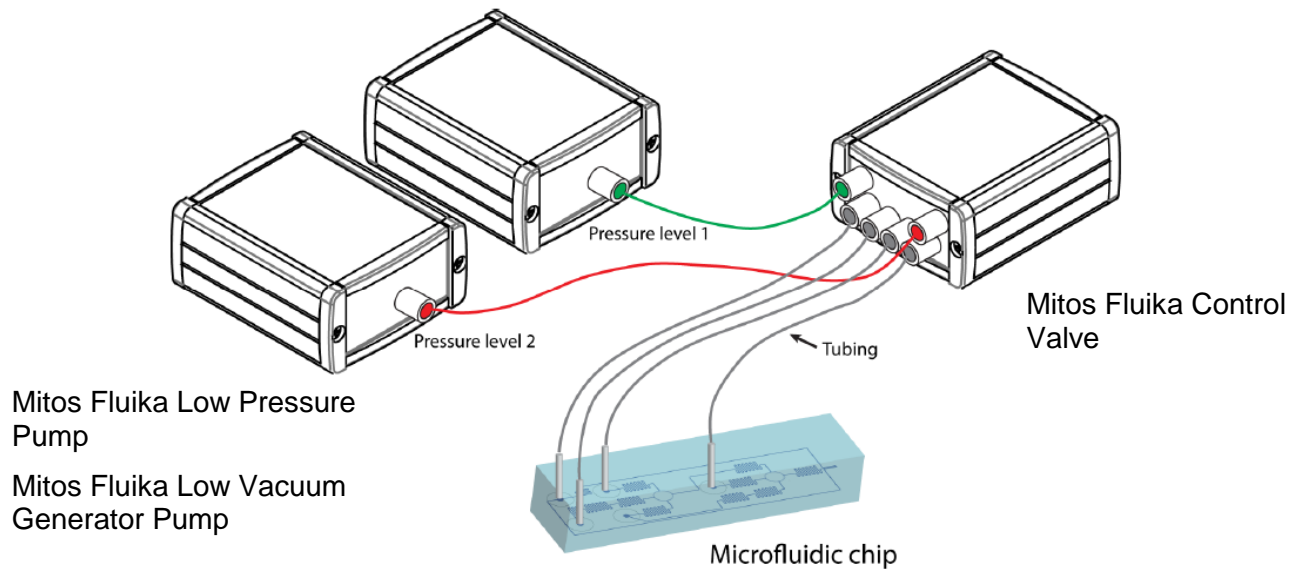


Schematics

On the front of the device are six Push-fit pneumatic connectors for 4mm OD tubes or plugs. Two of these connectors are for pressure supplies and four are outlets of valves. If a valve is switched off, the respective outlet is connected to supply 1 (Poff). If the valve is switched on, then the outlet is connected to supply 2 (Pon). If your application requires control of less than four outlets, seal the remaining outlets with blind plugs.

Main Benefits and Applications

The MitoS Fluika Control Valve is a good choice for applications where fast switching between two pressure or vacuum levels is required. A typical example could be microfluidic flow control, which is illustrated below:



These two pressure levels could be provided by the MitoS Fluika Low Pressure Pump and the MitoS Fluika Low Vacuum Generator Pump, which are also easy and fast to connect using 4mm OD tubing. If one pressure level is atmospheric, the supply inlet of the MitoS Fluika Control Valve can be left open.

Performance

Performance of the valve controller is described by:

- Switching speed
- Gas flow properties
- Timing accuracy

Switching speed characterizes time from electrical signal to physical actuation of the valve. Switching speed does not depend on the pneumatic circuitry and the volume of the reservoir connected to the valve.

Gas flow properties are describing pneumatic resistance to the gas flow. Because of finite flow rate, the speed of pressure switching is depending on the size of the reservoir, where pressure is switched. Pressure stabilization through the valve is described by:

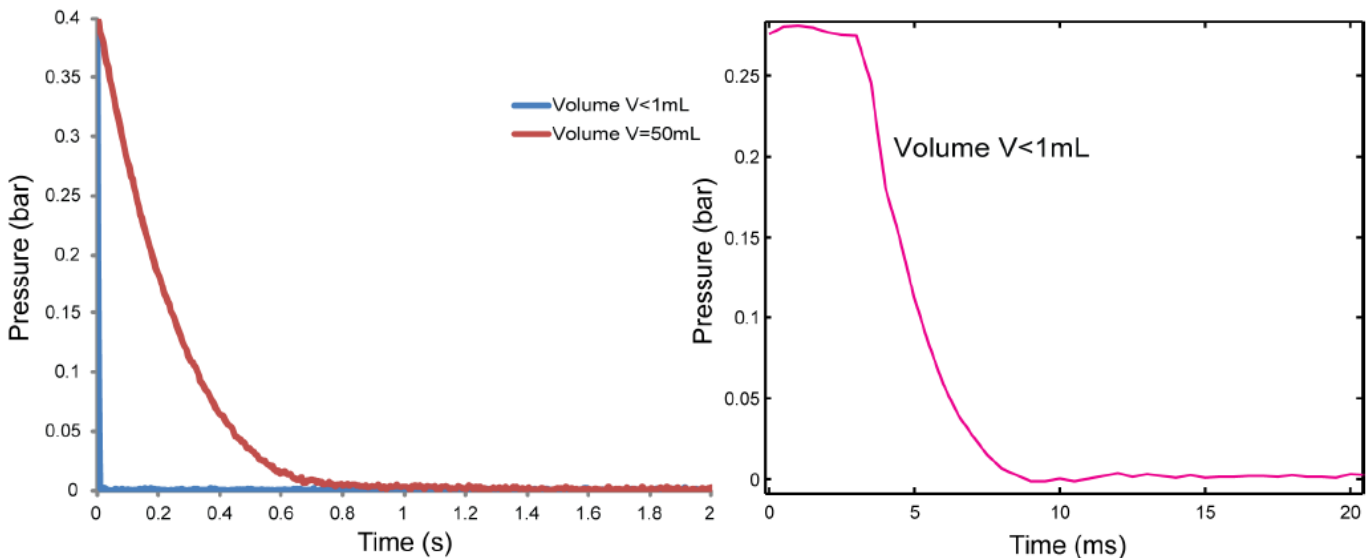
$$\Delta p \approx \Delta p_0 e^{-\frac{R_{rel} t}{V}}$$

Where R_{rel} release rate (mL/s) and V is volume of the reservoir. The characteristic time scale would be:

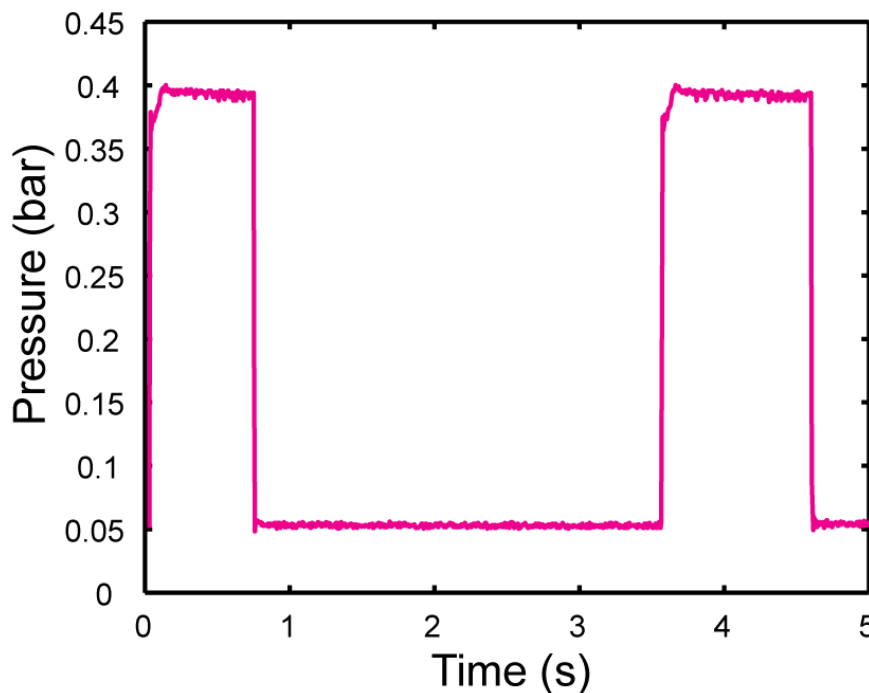
$$\tau = \frac{V}{R_{rel}}$$

Timing accuracy is a function of the control electronics, which defines the accuracy of the switching signals.

Typical performance is shown on the following figure:

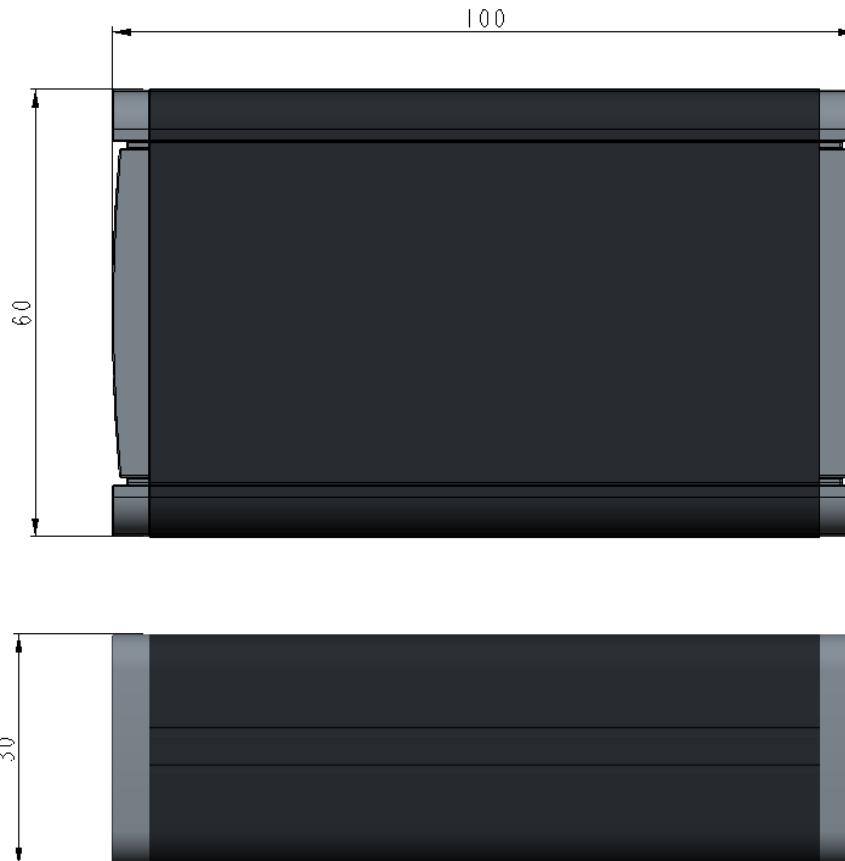


The left graph shows pressure relaxation through the valve depending on the volume of the reservoir V (<1mL or 50mL). The right graph shows a closer look at small volume ($V < 1\text{mL}$) response, it can be seen that the switching speed is <5ms. Total response time, in the case of small a volume reservoir could be <10ms. An example of switching between two pressure levels (0.05 and 0.39) is shown in the following figure:



Dimensions

Length: 100mm
Width: 60mm
Height: 30mm



Control Commands

Control commands of the Mitos Fluika Control Valve are listed below and followed by detailed description, syntax and usage examples of each command. Each command line is finished by enter ('\r' or ASCII: 13), thereafter the command is executed and depending on the command, it may return some value. Returned values are on one line, separated by '\r' + '\n' symbols. Key parts of returned values are in parenthesis '(...)' and containing two parts: first name of return value and then value itself, which are separated by colon ':'. The part outside of parenthesis is for verbal explanation.

List of commands:

- **ls**
- **sn**
- **dev**
- **valve**

Detailed description:

Command	Description	Syntax	Example
ls	Commands list. (<i>parameters: no</i>) Displays all possible commands in this device	ls	>ls conf dev ... <i>list</i>
sn	Serial number. (<i>parameters: no</i>) Displays 6-digit serial number of the device. Name of return value is 'SN'	sn	>sn (SN:040056) >
dev	Device name. (<i>parameters: no</i>) Displays name of the device. Name of return value is 'DEV'	dev	>dev (DEV:VC4) >
valve	Set valve. (<i>parameters: valve state</i>) Valve state (vvvv) contains four characters corresponding to four valves (v1 v2 v3 v4), where each can be: <ul style="list-style-type: none"> • '1' – set valve on • '0' – set valve off • 'x' – do not change state of this valve <p>Start-up state of valves is all off '0000'.</p>	Valve vvvv	>valve x0x1 >

Graphical application software and drivers to test and operate the pumps can be obtained upon request. Please contact: support@dolomite-microfluidics.com

For more information, please refer to the Driver Installation Guide for the Mitos Fluika Control Valve which is available in the user guide section of our website:

<http://www.dolomite-microfluidics.com/en/downloadsmain/user-guides>

Product Specification

Characteristic	Typical	Minimum	Maximum	Unit
Electronic time resolution	1	n/a	n/a	ms
Valve response time	5	n/a	10	ms
Pressure change rate depending on the volume of reservoir (R_{rel})	300	200	n/a	ml/s



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