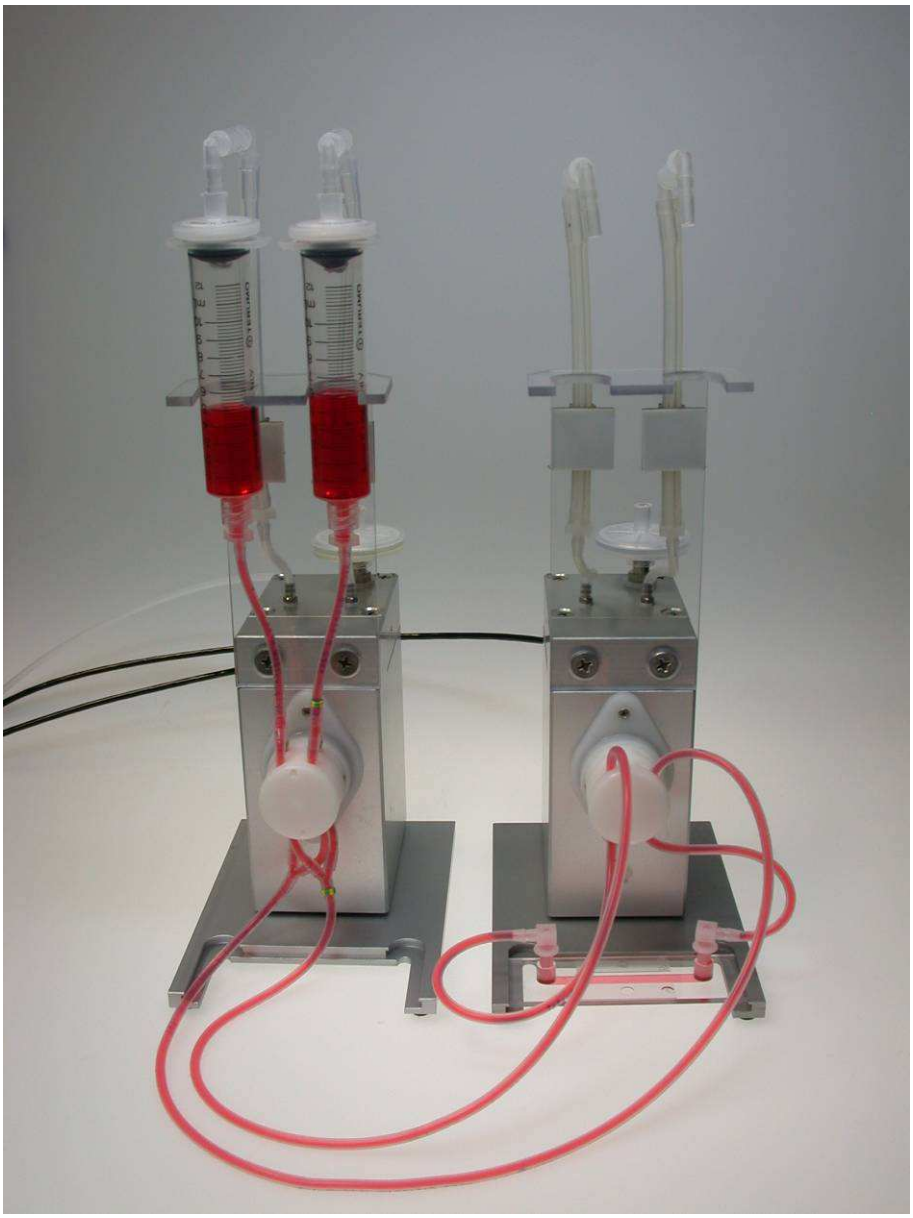
Instruction Manual for Pulsatile Flow

Version 1.5.0



1 Working principle and installation

As described in the general instruction manual the ibidi Pump and the ibidi Fluidic Unit are designed to work together to create a flow – unidirectional, oscillating, or pulsating – of medium within the channel of the ibidi slides. In order to create a pulsatile flow you need one pump and two Fluidic Units. The first Fluidic Unit will create a unidirectional flow which the second Fluidic Unit will periodically interrupt to create pulsation.

Please follow these steps to set up a pulsatile flow experiment:

1. Connect the pump to your computer and the two Fluidic Units to the pump. Plug for example the first Fluidic Unit to 'Port 1' of the pump and the second to 'Port 2'.

2. Connect the air pressure tubing only to the first Fluidic Unit.

3. Mount the Perfusion Set on the first Fluidic Unit.

    - This experiment works best with long Perfusion Sets like 'yellow/green', 'white', and 'black'.

4. Using the pump and the first Fluidic Unit set up a continuous and unidirectional flow with the desired flow rate and the resulting shear stress with the help of the PumpControl software.

5. Route the tubing of the Perfusion Set which is coming out of the first Fluidic Unit through the pinch valve of the second Fluidic Unit. Make sure that you use either the two front or the two rear openings of the pinch valve for that. Do not intermix front and rear openings. Compare your set-up with Figure 1.

6. Run the second Fluidic Unit in the PumpControl software as an 'oscillating' Unit. This way you can select the switching time in the range of 0.2s – 5s which results in pulsation periods of 0.4s – 10s. This in turn corresponds to frequencies of 2.5Hz – 0.1Hz. Set settings are shown in Figure 2.

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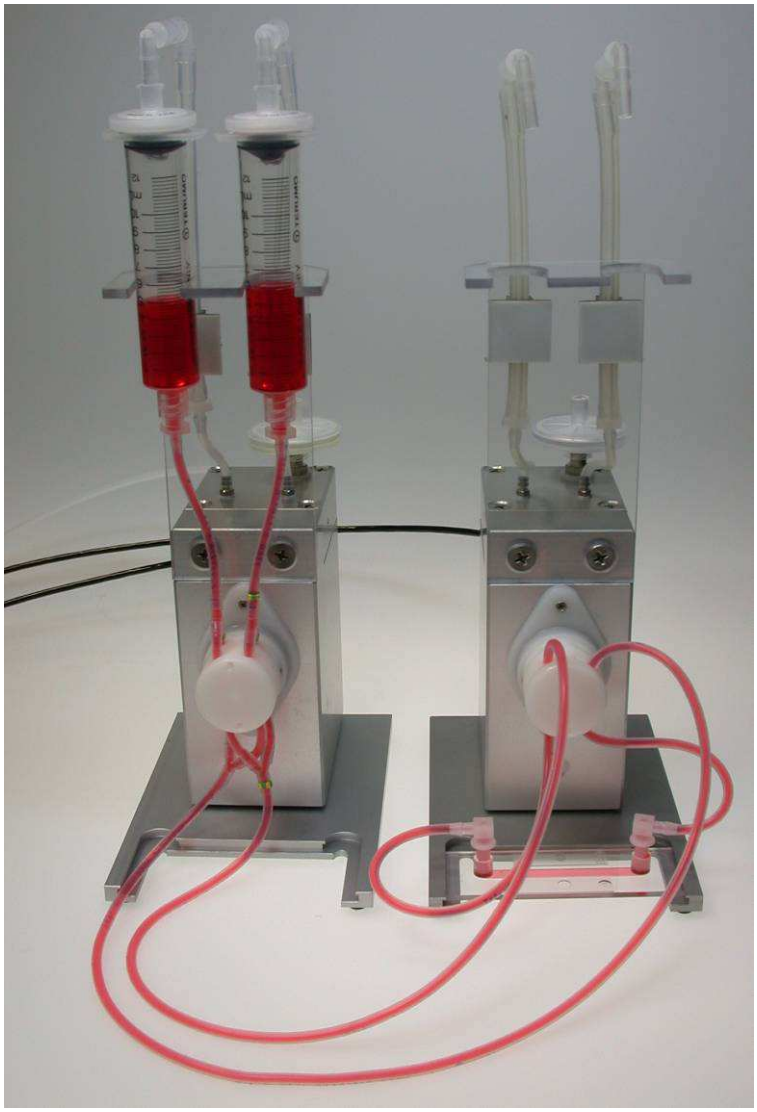

Figure 1 Set-up for pulsatile flow. Continuous flow in the Perfusion Set coming out of Fluidic Unit 1 is periodically pinched off by Fluidic Unit 2.

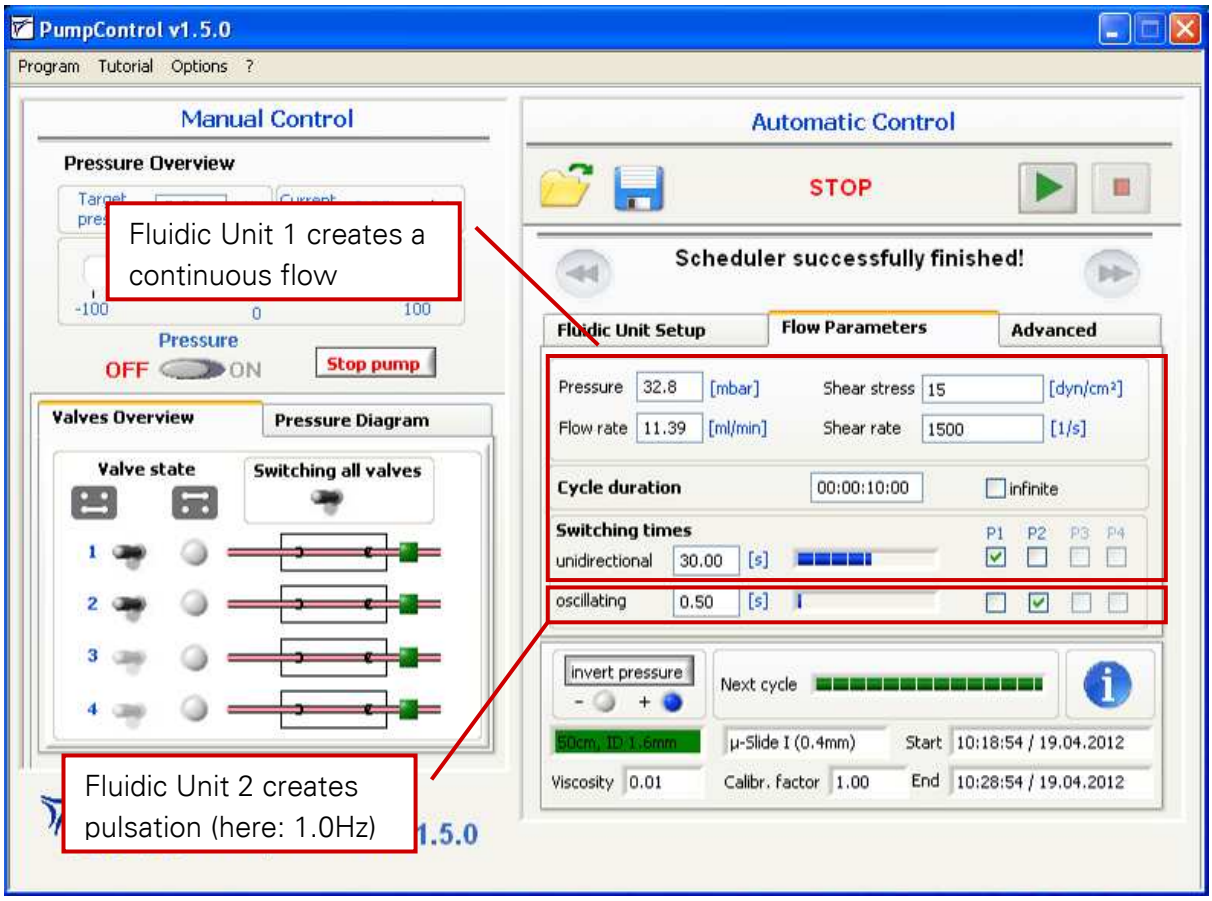

Figure 2 Settings for PumpControl