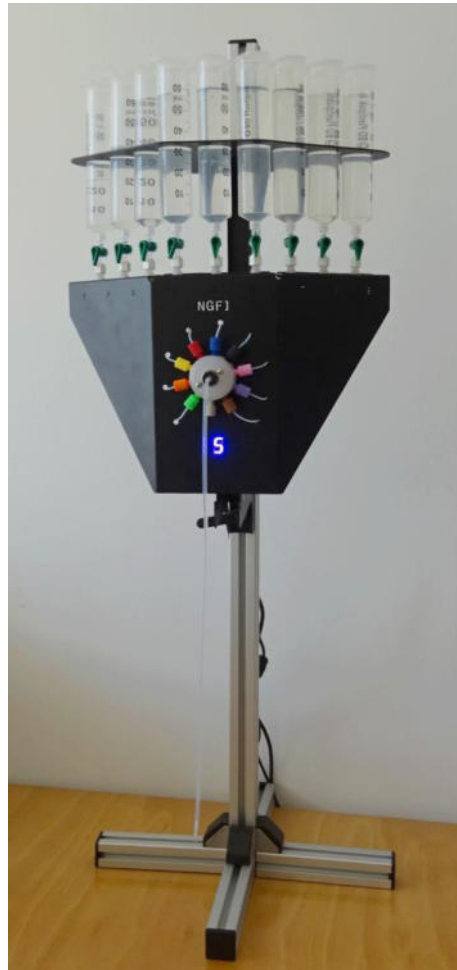




NGFI Perfusion System PS 9

operation manual



- Up to 9 Channels
- Programmable time and sequence functions
- Programmable fill and wash functions
- Easy removable reservoirs for filling and emptying
- Compatible with Imaging and Data Acquisition systems



Next Generation Fluorescence Imaging

Table of Contents	Page
Introduction.....	3
Assembly instructions.....	3
General handling information.....	4
Perfusion Control software.....	4
List of components.....	7
NGFI contact data.....	7
Appendix.....	8



Next Generation Fluorescence Imaging

Introduction

The NGFI Perfusion System PS 9 is a gravity driven 9 channel perfusion system based on a rotation valve channel switch.

Due to the high-speed rotation valve, switching from one channel to another can be achieved in a minimum of time and with high precision. Nine positions of the valve are connected with reservoirs, one position is used as stop position to stop the flow of perfusion media.

The Perfusion System PS 9 is delivered with a perfusion control software for 64 Bit Windows Computer Systems which is easy to handle and it makes the perfusion process as simple as possible.

The Perfusion System is connected via USB to the Computer and to the electrical power supply via mains adaptor.

With the perfusion control software a perfusion sequence can be programmed which will be automatically processed after starting. In addition there are program sequences for filling the reservoirs and tubing with buffer solution before starting the experiments and sequences for rinsing the reservoirs and tubing after the experiments.

Reservoirs are special perfusion syringes BD Plastipak with 60 mL volume and can easily be removed for buffer-solution filling or removal. The Perfusion System PS 9 is mounted on a stand and adjustment of height can easily be executed to achieve the desired flow rate. The display in the front shows the active channel.

Assembly Instructions

The Perfusion system is delivered with all necessary components and after a few handling operations ready to use.

- Fit the main part of the Perfusion System containing the rotation valve and the reservoir holder with the clamping system on the back on the bar of the stand and attach it properly.
- Attach the Vygon stop valve to the perfusion reservoirs BD Plastipak, attach the Adapter Female Luer and put it on the reservoir holder on the stand (9 times)
- Prepare the PTFE tubing for connecting the corresponding reservoirs with the rotation valve entry by cutting it with a cutter (scissors might squeeze the tubing and block the flow).
Recommended lengths are reservoir 1& 9: 24,5cm ; reservoir 2&5: 19,5cm;
reservoir 3& 7: 14,5cm ; reservoir 4&6: 11,5cm ; reservoir 5: 10,5cm



Next Generation Fluorescence Imaging

- Attach one tube end fitting on the tube by screwing it with a ferrule in a Adapter Female Luer until the ferrule attaches on the tubing. Then remove the Adapter Female Luer and pass the tubing through the corresponding hole in the main part of the Perfusion system and attach it to the Adapter Female Luer of the corresponding reservoir, repeat this step for attaching the other end of the tubing to the corresponding rotation valve entry. Repeat this procedure for each reservoir and rotation valve entry (see appendix Cheminert Flangeless Fittings).
- Attach the Diba Click-N-Seal™ Adapter to the outflow opening of the rotation valve and attach the silicone tubing.

General handling information

The NGFI Perfusion System PS9 is a rotation valve system and therefore has 9 positions for buffer solution entry and one stop position. It is recommended that you fill neighbouring reservoirs for your experiment giving the rotation valve a shorter way for switching. It has to be considered that a small amount of buffer solution (2,3-2,9 μL) will enter the outlet flow when you pass a channel with the rotation valve without remaining there. If you want to avoid this then you have to close the manual valve attached on the reservoir. Also you have to close the manual valve of an empty reservoir if you want to avoid that air bubbles enter the system when passing the channel with the rotation valve.

If you want to fill the reservoirs or empty the reservoirs quickly you can remove them from the perfusion system after closing the manual valve attached on them. Before starting the experiment make sure that all the used tubes are filled with buffer solution and that there are no air bubbles inside , for this you can use the fill mode of the perfusion control software. After the experiment make sure that all the used reservoirs and tubes are rinsed with distilled water or ethanol, for this you can use the wash mode of the perfusion control software.

Perfusion Control Software

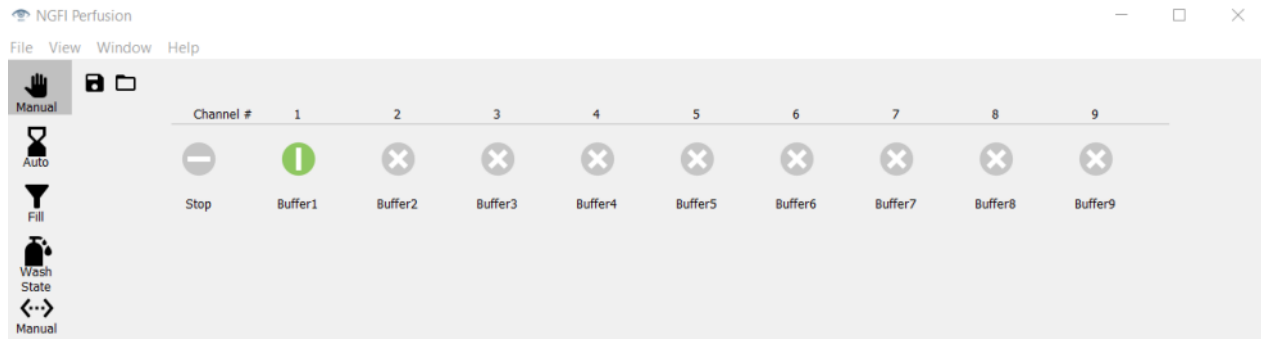
The NGFI Perfusion System PS9 comes with an installer file for the Perfusion Control Software for Windows 64bit Computer Systems. Transfer the Installer file of the provided USB drive on your computer and install the software.

The Software offers following modes:



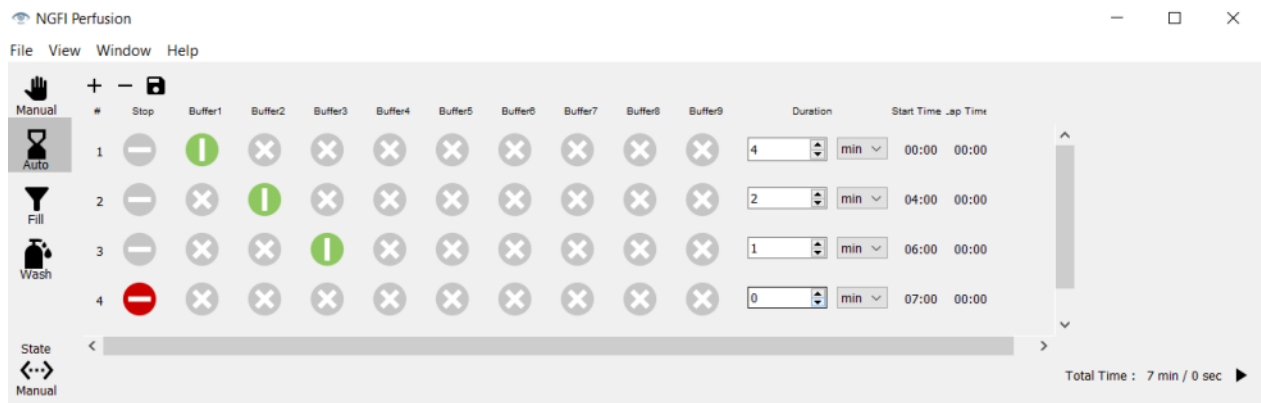
Next Generation Fluorescence Imaging

Manual mode



In the Manual mode the 9 channels can be switched successively in any order, nevertheless it is advisable to fill neighboring reservoirs first. If desired the channel names of Buffer1 to Buffer 9 can be renamed.

Auto mode

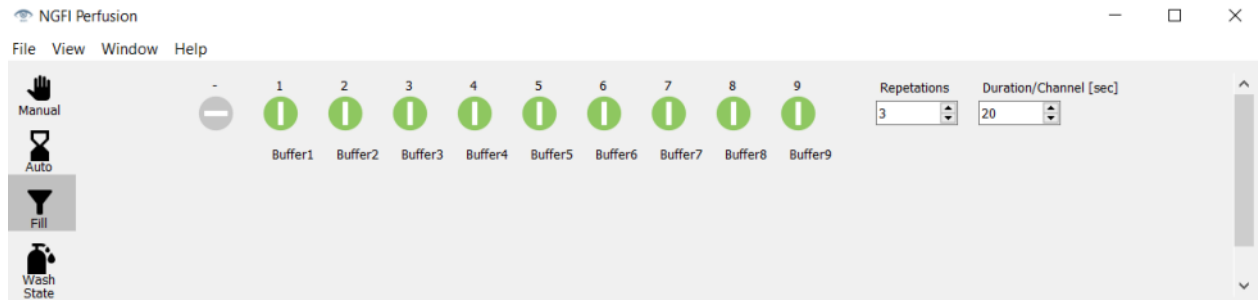


In the Auto mode all channels can be programmed and an automatically proceeded perfusion sequence can be started. The Auto mode is started by pressing the start button on the right side. The line of the active channel is highlighted in green color. If you want to stop the auto mode, just press the stop button appearing on the left side.



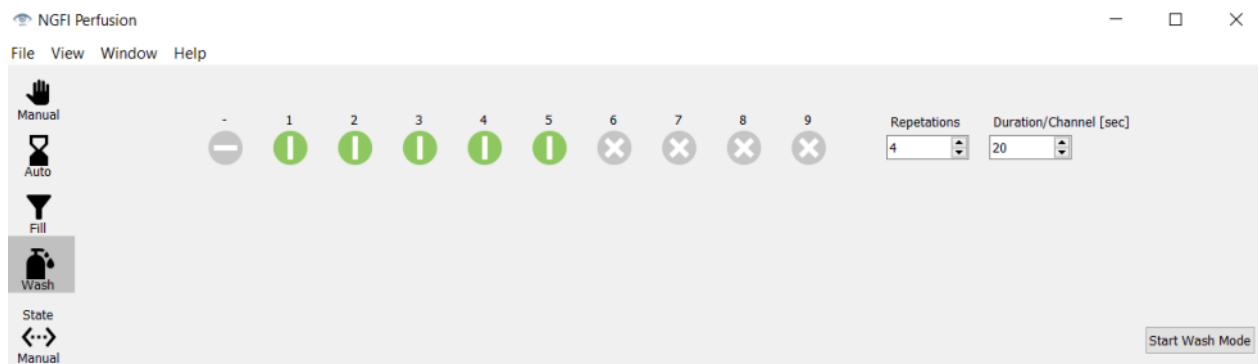
Next Generation Fluorescence Imaging

Fill mode



In the Fill mode the tubes are filled with buffer solution and each channel can be programmed for duration of filling time and repetitions.

Wash mode



In the Wash mode all used channels can be rinsed with distilled water or ethanol to clean the tubes. Don't forget to rinse your channels after use to assure a long life of your perfusion system.

Whilst using the Perfusion System a Log file is being created and can be read out after to get the information of the sequences of the perfusion process.

Also it is possible to save a specific perfusion setting on your computer and to reload it to use it again or to adapt it for further experiments.



Next Generation Fluorescence Imaging

List of components

- main part with reservoir holder and mounted rotation valve motor P201-O
- perfusion system rack
- 9 perfusion reservoirs BD Plastipak
- 9 Vygon stop valve
- 9 Adapter Female Luer - Female Union 1/8
- 9 Flangeless 1/16" tube end fittings (9 Polypropylene nuts with 9 ferrules)
- 1 Cheminert Plug 1/4"-28 for stop
- Diba Click-N-Seal™ Adapter, 1/4"-28 UNF(M) flat bottom to 1/16"
- VICI JR-T-40361/16" OD natural PTFE tubing, ID 0.75 (mm)
- Cole Parmer silicone tubing GZ-06411-62 (1/16" ID , 1/8" OD)
- USB-power cable combination
- USB-Stick with NGFI perfusion control software

NGFI GmbH

Next Generation Fluorescence Imaging

VAT-Number: ATU70385424

Commercial Register: FN448322y

+43 31638571960

Gottfried Schatz Forschungszentrum

Neue Stiftingtalstraße 6/6

8010 Graz, Austria

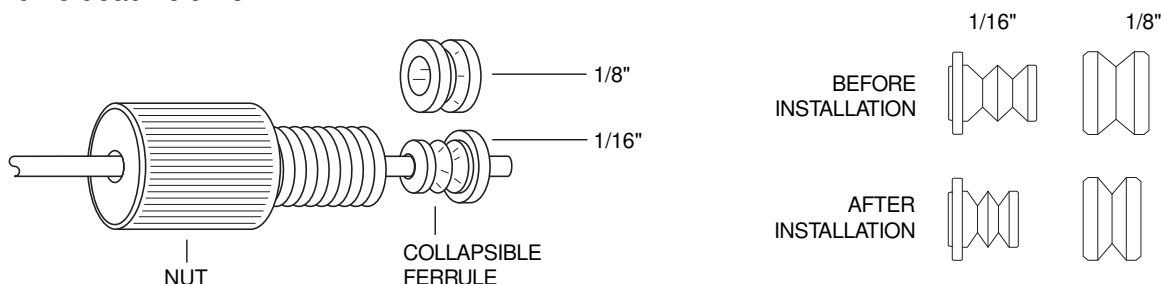
www.ngfi.eu

sales@ngfi.eu



Cheminert® Flangeless Fittings with collapsible ferrule

Cheminert flangeless fittings now include our new patented* collapsible ferrule design. This innovative design utilizes a one-piece ferrule engineered to collapse as it is tightened. The collapse takes place in two very narrow areas, and results in a very effective seal with virtually no distortion of the tubing ID and no dead volume.



Instructions

1. Use a sharp razor blade (or polymer tubing cutter) to cut the tubing, making sure that the cut is square and that the tubing is not crushed.
2. Slide the nut onto the tubing, followed by the ferrule. With 1/16" ferrules, the small end goes toward the nut. For 1/8" ferrules, the orientation doesn't matter.
3. Screw the assembly part way into a 1/4-28 female fitting (or a Cheminert setting tool, p/n CST).
4. Make sure the tubing is pushed all the way into the female fitting, then screw in the nut until you feel the increase in resistance which signifies that the nut has contacted the ferrule. Finger-tighten it 3/4 turn past that point.

NOTE: These instructions are valid for the standard CTFE collapsible ferrules (p/n CFL-CB1KF or CFL-CB2KF) as well as the optional PEEK ferrules (p/n CFL-CB1PK or CFL-CB2PK), but the PEEK ferrules require a little more force to apply the 3/4 turn. Either ferrule used with PEEK tubing may require one full turn, but *tightening in excess of one turn is not advised*. We strongly recommend the use of PEEK ferrules with PEEK tubing.

Caution:

Extreme overtightening can result in loss of sealing capacity.

Retightening a previously made up fitting

Screw the nut into the fitting detail approximately 1/4 turn after the nut begins to compress the ferrule.

*Patent No. 6,575,501

North America, South America, and Australia/Oceania contact:

VICI® Valco Instruments Co. Inc.
P.O. Box 55603
Houston, TX 77255
Sales: (800) 367-8424
Tech: (713) 688-9345
Fax: (713) 688-8106 valco@vici.com

Europe, Asia, and Africa contact:

VICI® VICI AG International
Parkstrasse 2
CH-6214 Schenkon
Switzerland
Phone: +41 41 925 6200
Fax: +41 41 925 6201 info@vici.ch

Cheminert® and VICI® are registered trademarks of Valco Instruments Co. Inc. and VICI AG

TN-505a Rev 10/03

OEM Module

RVM

Rotary valve



Selection



Switch



ON / OFF

This is an OEM product.

It can be tailored for the needs of your instrument.



BENEFITS

- Straightforward integration
- Low power
- Small footprint
- Fast switching speed
- Chemically resistant and biocompatible materials



APPLICATIONS

- Sample preparation automation
- Multiplexing
- Sample loops
- Adapted for battery operated devices



FUNCTIONS

- Select channel
- Change flow path
- Stop flow or isolation

THE ULTRA-LOW INTERNAL VOLUME ROTARY VALVE

HANDLE SMALLER SAMPLES. REDUCE CONTAMINATION.

Our OEM valve is a precise low-pressure electric rotary valve designed for automated microfluidic applications. Its exceptionally small channels and accurate positioning system make it ideal for precise liquid handling.

Showing an unrivaled small wetted volume and an exceptional ease of use, this valve is the perfect companion for liquid distribution in your instrument or laboratory experiments at a reduced cost. A low power model exists for a minimum battery use and a fast one exists for your time-specific applications.

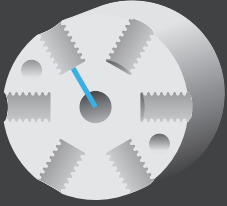
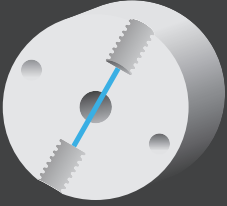
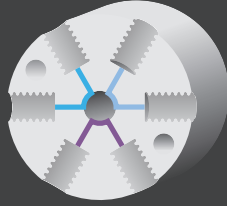
Model specifications

CONFIGURATION	POWER	ROTATION TIME FOR 180°	WEIGHT (TOTAL MODULE)	DIMENSIONS
Low power motor	5-10 VDC, 0.5 A peak	1.5 s	300 g	29 x 38.3 x 111.8 mm
Fast motor	18-24 VDC, 1.15 A peak	200 ms	650 g	42.3 x 60 x 95.9 mm

Other specifications

Operating temperature	5-40°C (41-104°F)
Operating humidity	20-80%, non condensing
Max. pressure	5 bars (72 psi)
Wetted materials	PTFE, PCTFE
Channel diameter	0.5 mm (0.020 in) / 0.4-1 mm (0.015-0.039 in) available upon request
Internal volume	2.32-2.84 µL port-to-port (Configuration dependent)
Carryover volume	0.55-1.07 µL port-to-port (Configuration dependent)
Dead volume	None
Tube port fittings	Standard 1/4-28 UNF, flat-bottom
Electrical interface	USB mini, (RS-232, RS-485 upon request)
Communication type	Serial, I2C (other upon request)

Valves types

REF. #	VD1-6	V01-2	VS1-6
NAME	7-PORT/6-POSITION	ON/OFF	6-PORT/2-POSITION
LIQUID PATH			
INTERNAL VOLUME	2.84 µL	2.75 µL (0.5 mm channels) 3.98 µL (0.75 mm channels)	2.32 µL
CARRYOVER VOLUME	1.07 µL	0.98 µL (0.5 mm channels) 2.21 µL (0.75 mm channels)	0.55 µL
DEAD VOLUME	None		

Other models available upon request

Fast liquid switching

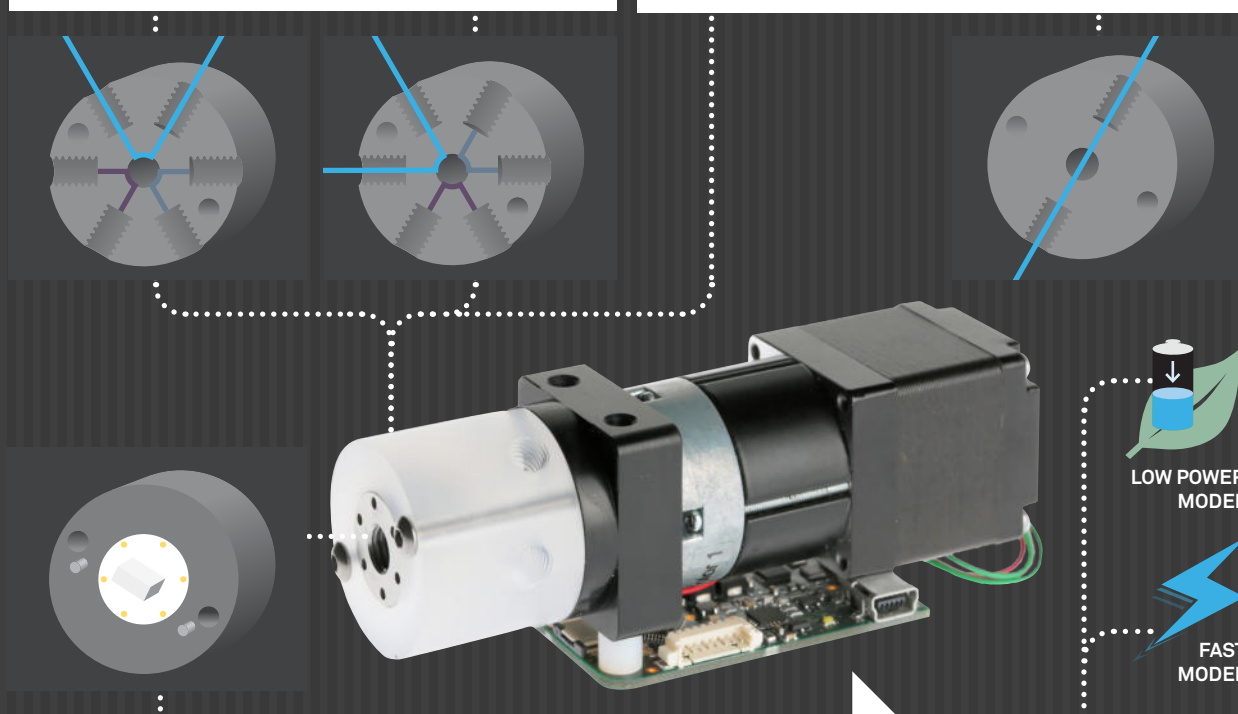
This extremely small internal volume selection valve allows to rapidly switch liquid, while maintaining an ultra low carryover.

Valid for all models.

Ultra-low internal volume

Our unique precise valves exhibit an internal volume (port-to-port) of 2.3 to 2.9 µL due to their exceptionally small 0.5 mm diameter channels.

Valid for all models.



Integrated sensor

The position sensor is directly integrated into the valve to ensure precise positioning. An automatic procedure at power-up allows the valve to know its precise location. This is called the «homing».

Choice of motor

LOW POWER MODEL

This valve was designed in the most simple way to reduce its power consumption. It is USB powered. A smaller power consumption allows for a smaller power supply, and thus better portable device integration.

FAST MODEL

This valve is designed to reduce the switching speed, taking no more than 200 ms.