

Science Together



# AZURA® Bio purification

Extensive and flexible FPLC solutions

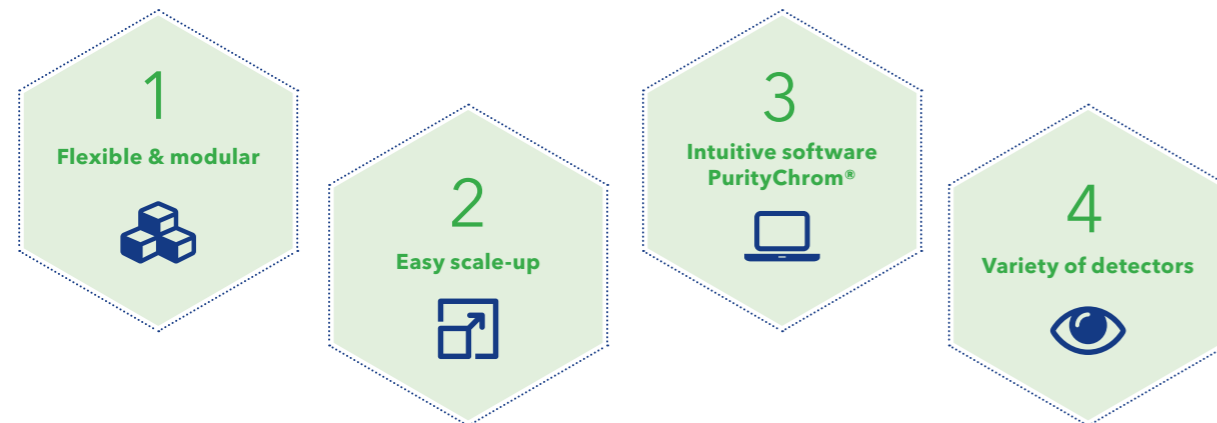


# KNAUER protein purification

## The flexible FPLC platform

### AZURA® Bio purification systems

Complete solutions for FPLC on a minimum footprint: AZURA FPLC systems combine flexibility and reliability. The biocompatible/metal-free FPLC is the perfect choice for your protein purification task.



Design your AZURA Bio purification system to your needs. Multiple functionalities such as automatic sample injection via autosampler, column switching, buffer and sample selection as well as fraction collection enable the user to automate the purification process.

A large range of different detectors make your target molecules visible. Different flow rates and compatibility to columns from all vendors offer maximum flexibility. The intuitive software PurityChrom® combines all the advantages of a versatile purification software.

### Fast Protein Liquid Chromatography (FPLC)

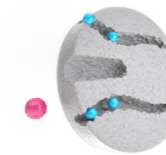
FPLC is a liquid chromatographic method for purification of large biomolecules like proteins. External factors like high temperature, high pressure, extreme pH, or solvents can disturb the protein structure and are therefore avoided in FPLC. Be-

sides, the method uses column materials out of agarose or polymer material which are very sensitive against pressure fluctuations and air bubbles.

**We designed our systems to meet your purification challenges!**

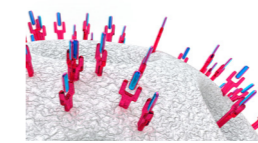
### AZURA® Bio purification: You choose the method

#### Size Exclusion Chromatography (SEC)



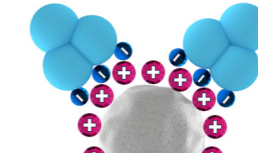
Separate according to size. See page 22 for a specialized AZURA system for SEC.

#### Affinity Chromatography (AC)



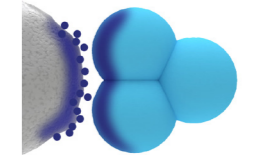
Specific binding of protein of interest. See page 23 for a specialized AZURA system for AC.

#### Ion-Exchange Chromatography (IEX)



Separation takes place according to the charge of the protein and gradient elution.

#### Hydrophobic Interaction Chromatography (HIC)



Separation is performed based on hydrophobic interaction and gradient elution.

### Purification strategy: Often a sequence of different methods is used in purification.



Normally a combination of methods is used in protein purification.

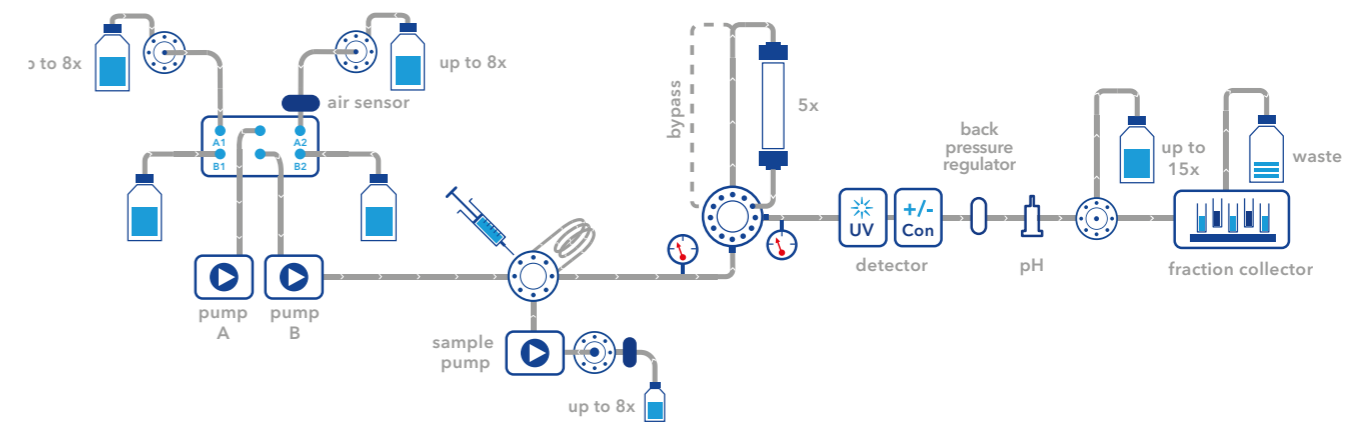
- The "capture" step purifies the protein from the crude extract.
- The "intermediate" step removes further contamination.
- The aim of the final "polishing" step is to get rid of all remaining impurities in order to gain a highly purified product.
- Automatization of two purification steps is possible using the especially designed AZURA Two step purification system (see page 24).



# AZURA® Bio Lab purification system

From simple to complex, from lab to pilot scale: Design your AZURA® FPLC system according to your purification task!

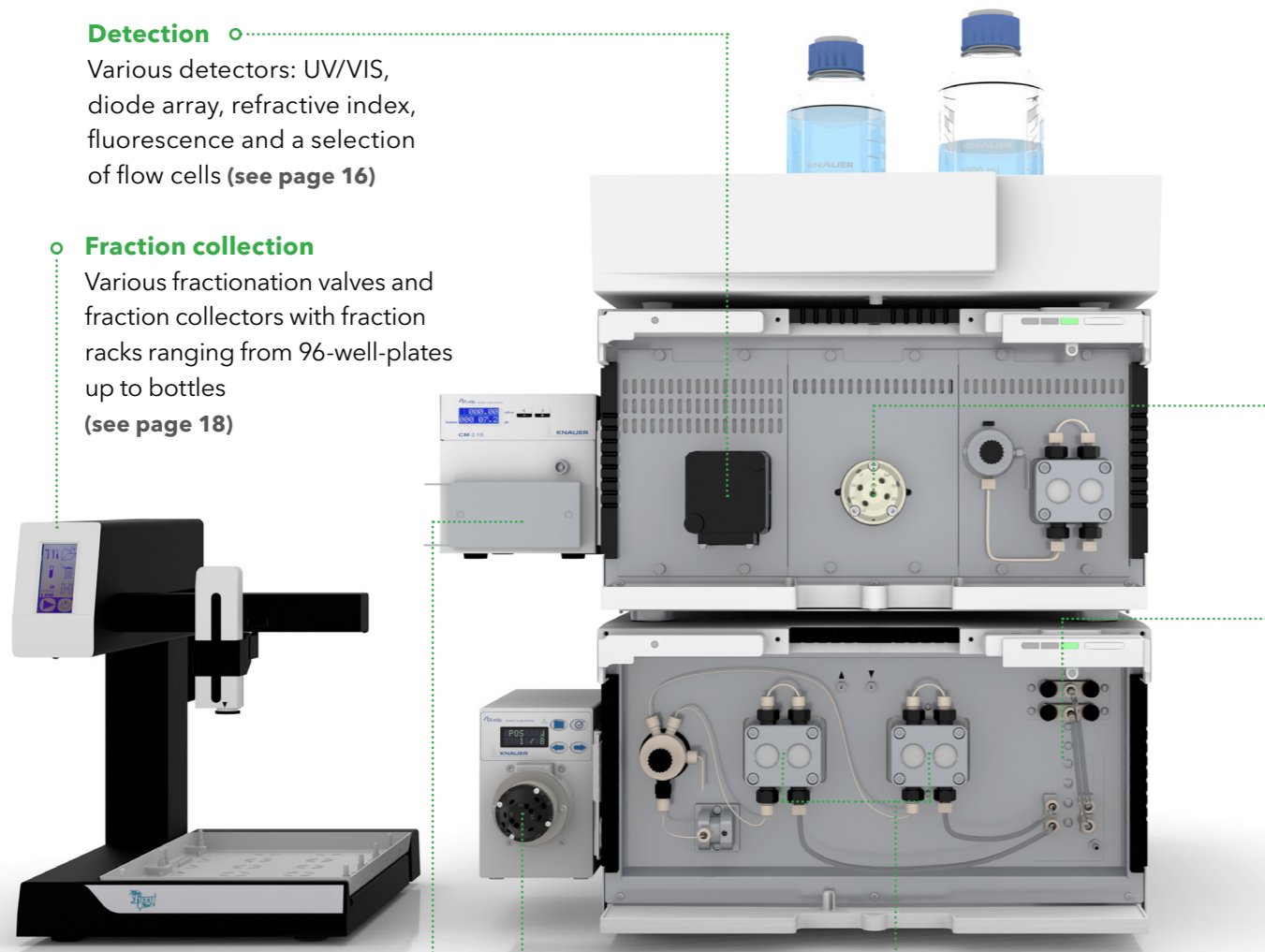
AZURA Bio Lab allows you to create FPLC systems with highest independence. Just pick your modules and build-up the system yourself. The intuitive software PurityChrom will be flexibly adjusted to your system.



**Intuitive PurityChrom® software**  
(page 26)

**Sepapure® FPLC columns**  
(page 12)

**Automate your purification**  
(page 20)



**Detection**  
Various detectors: UV/VIS, diode array, refractive index, fluorescence and a selection of flow cells (see page 16)

**Fraction collection**  
Various fractionation valves and fraction collectors with fraction racks ranging from 96-well-plates up to bottles (see page 18)

**Conductivity monitor**  
With pH option (see page 16)

**Column and loop selection valve**  
Choose between five columns or loops. Reverse flow possible.

**Buffer delivery**  
Quaternary or binary pumps with flow rates up to 10 ml/min or 50 ml/min (see page 6)

**Injection**  
Manual or automated injection: via loop, sample pump or auto-sampler, sample selection valves available for up to 8 samples

**Buffer selection**  
Integrated buffer selection valve for 4 buffers, extra buffer selection valve optionally available (see page 6)

**Supporting all columns.**  
**Cold-room operation is supported.**

## Scale-up from lab to pilot

Choose the Pilot series if you want to increase your productivity even more. Upscale our Lab configuration with same flexibility, software PurityChrom® and minimal footprint. Just transfer and upscale your methods. Flow rates up to 1000 ml/min.  
**Find more information: [www.knauer.net](http://www.knauer.net)**

**Configure your AZURA Bio purification system**  
**Find all FPLC products on the following pages.**

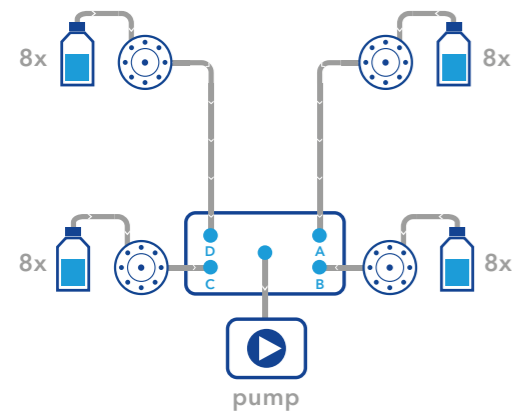
# Buffer delivery

Precise and reliable pumps covering a wide flow rate range, gradient and buffer selection options.

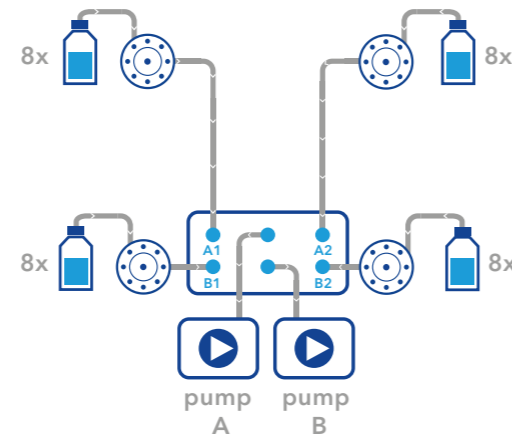
## Buffer selection

Automated switching between buffers is important for method development, column cleaning and regeneration. The pump P 6.1L features a build-in 2 x 2 buffer selection valve (A1, A2 and B1, B2) or 4 x buffer selection valve (A, B, C, D).

You can extend buffer selection with additional valves each for up to 8 buffers.



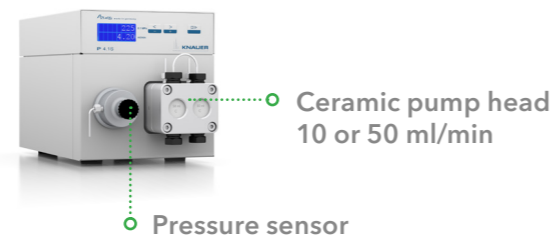
AZURA pump P 6.1L LPG - Quaternary gradient



AZURA pump P 6.1L HPG - Binary gradient

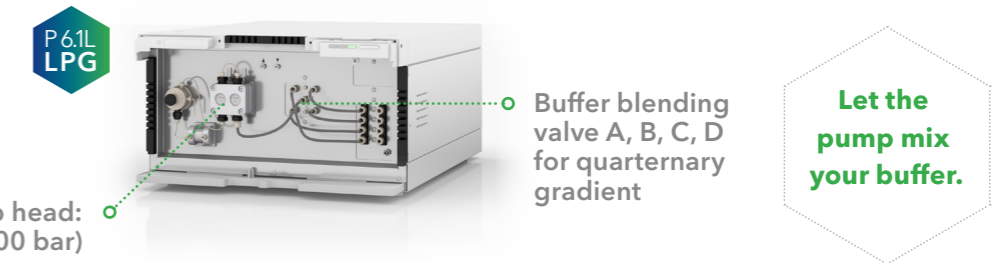
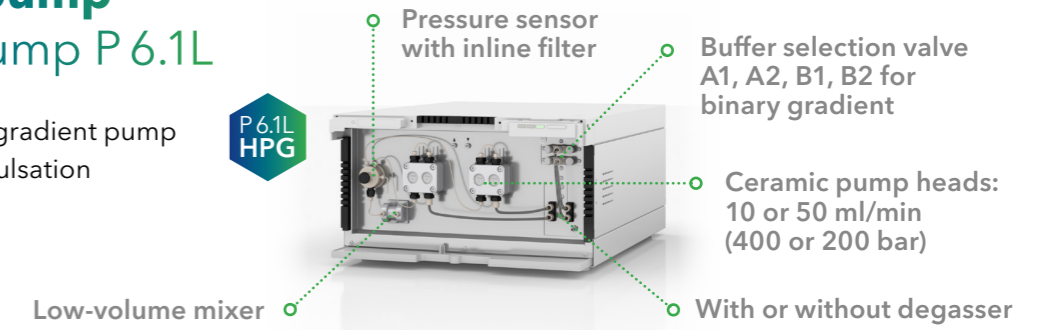
## Compact pump AZURA® Pump P 4.1S

Isocratic pump with small footprint for dedicated applications or sample loading.



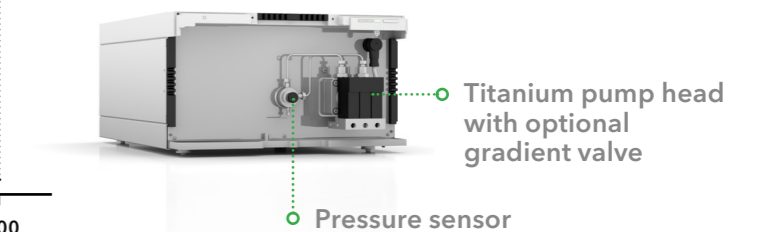
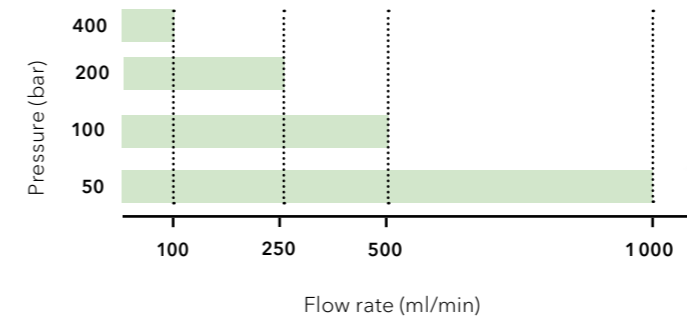
## Gradient pump AZURA® Pump P 6.1L

High-performance gradient pump optimized for low pulsation



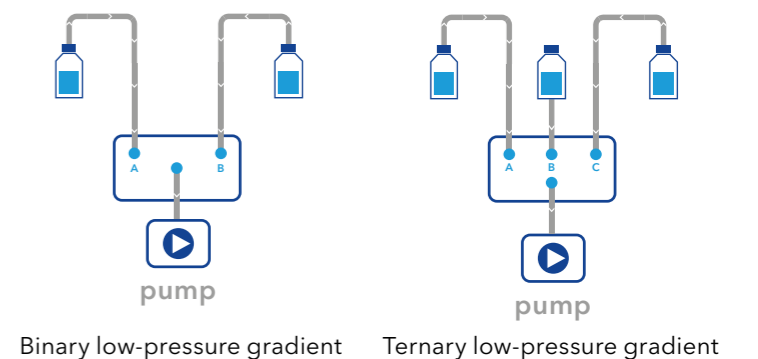
## Scale-up pump AZURA® Pump P 2.1L

Pumps for high flow rates



### Gradient options

From binary to quaternary gradient, with additional P 2.1L pumps or cost-effective binary low pressure gradient (2 x 1 buffers, up to 800 ml/min) or ternary low pressure gradient (3 x 1 buffers, up to 220 ml/min).





# Binary or quaternary gradient?

A quaternary low pressure gradient (LPG) module\* dynamically composes the buffer on the inlet-side or low pressure side of the pump head, by quickly switching the selection valve between the dif-

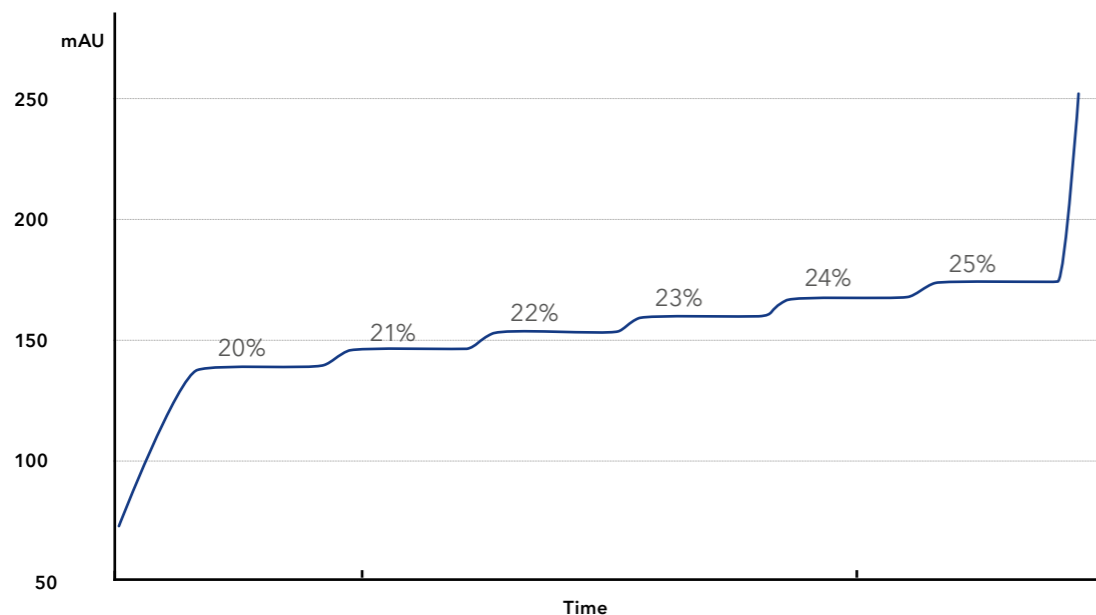
ferent channels. The buffer in a binary high pressure gradient (HPG) system is composed by combining the flow of two pumps.

## Quaternary gradient

- Low investment costs
- Limited flow rate range
- Channel usable for sample injection
- Gradient accuracy absolutely sufficient for FPLC

## Binary gradient

- Less wear
- No flow rate limitation
- Sample pump for sample injection (recommended)
- High accuracy for special application



Excellent gradient reproducibility of 0.3 % RSD. overlay of 6 repetitions at 1 ml/min run with pump P 6.1L low pressure gradient version

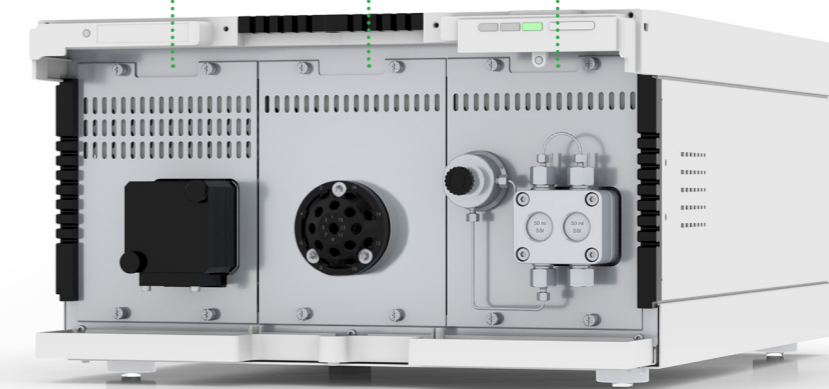
## Docking station for pumps, valves and detectors AZURA® ASM 2.2L

### A flexible combination module

The Assistant ASM 2.2L is a docking station for three compact devices. Valves, pumps and UV detectors can be combined in one housing. The plug-in modules are removed by loosening four screws allowing the user to exchange modules in case of service within minutes. Likewise, the configuration of the FPLC system can be adapted to new requirements. Routine maintenance work e.g. replacing the lamp of a detector is easily performed by the user.

Depending on the integrated modules the assistant fulfills many different tasks like eluent delivery, detection, sample and solvent selection, sample injection, column switching or fraction collection. An assistant including a pump, injection valve, and detector features a complete FPLC system, like AZURA Bio SEC or AZURA Bio AC. As a part of a larger system, the ASM 2.2L allows the user to customize the system configuration according to the purification challenge.

Freely combine pumps, valves and detectors in one housing



### Configure your assistant

Use the web-based assistant configurator to find your desired AZURA® ASM 2.2L module combination:  
[www.knauer.net/assistantconfigurator](http://www.knauer.net/assistantconfigurator)



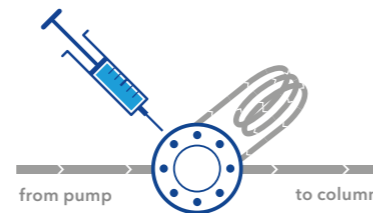
# Sample injection

Choose between manual or automated sample injection. Available modules include injection valve, sample pump, loop valves and autosampler.

## Injection valve

### Integrated into assistant or as standalone module:

The Multi-Injection valve for **AZURA Bio Lab** systems enables the sample injection via loop and sample pump. Using this smart valve the setup of an two-step purification is fast and easy.



The 2-position injection valve for **AZURA Bio pilot** systems is perfect for injection via a sample loop or a sample pump. If both injection possibilities are needed simply add two valves to your configuration.

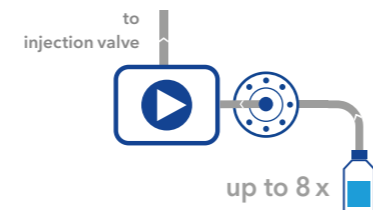
## Sample pump

### Integrated into assistant or as standalone module:

The AZURA P 4.1S is perfect for injecting large sample volumes and repetitive loop fills.

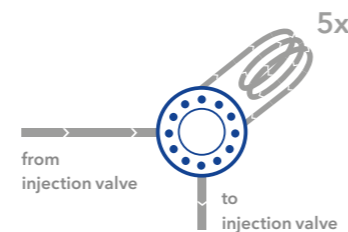
### Do you have many samples?

You can extend your configuration with additional valves for 8 samples.



## Loop valve

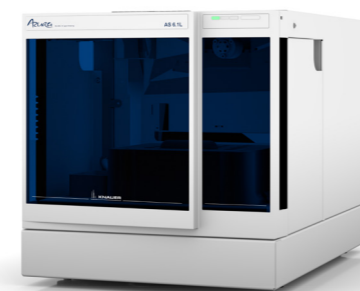
The Loop valve can be optionally used to connect up to 5 loops to the system or to collect intermediate fractions in automated two-step purifications with an AZURA Bio Lab system. Various sample loops are available.



## Autosampler

Process many different samples fully automatically with the Autosampler AS 6.1L.

- Up to 10 ml injection volume
- From microtiter plates to standard vials
- Active cooling
- Fully supported by PurityChrom® software
- Metal-free

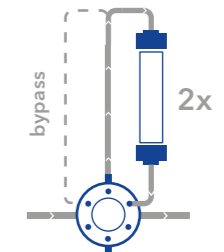


# Column selection

Different options for column selection are available.

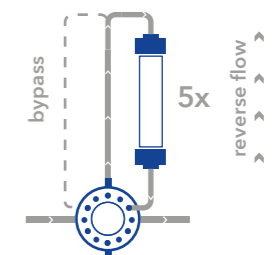
## 2-position valve

- Select two columns or one column and one bypass
- Flow rates up to 500 ml/min possible



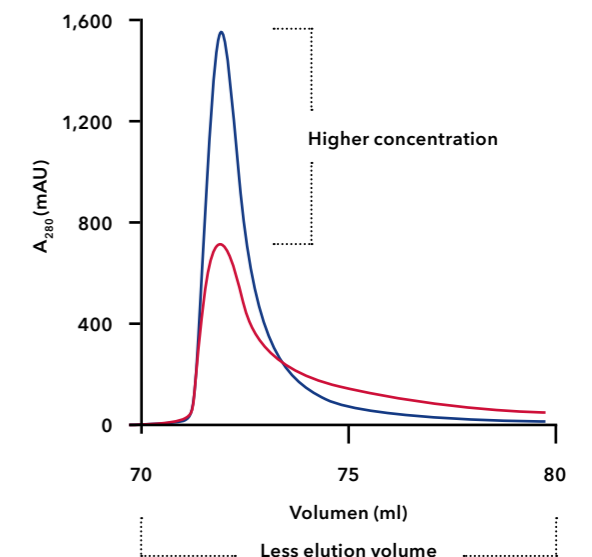
## Multifunctional selection valve

- For up to 5 columns and 1 bypass
- Reverse flow
- Flow rates up to 50 ml/min



### Why is the reversed flow option popular in affinity chromatography?

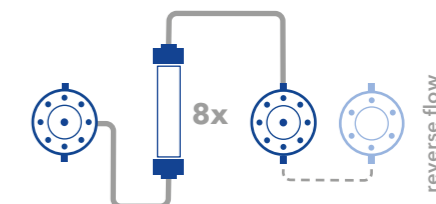
In affinity chromatography your target molecules will accumulate at the top of the column. Elution in the same direction dilutes your target molecule along the column. By elution with reversed flow you increase the concentration while decreasing the sample volume.



The option has two major advantages. Clean your columns more efficiently using reverse flow. By this you elute contamination the shortest way and minimize damage to the column.

## Higher flow rates?

Use the column selection assistant to select eight columns assuring a flow rate up to 500 ml/min. An additional valve allows to reverse the flow.





# Sepapure®

## Bio purification columns and media

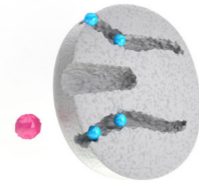
The perfect addition to any FPLC system

### Size Exclusion Chromatography (SEC)

In size exclusion chromatography biomolecules are separated according to their size. There are two different methods used in SEC which are defined by the matrix of the FPLC columns.

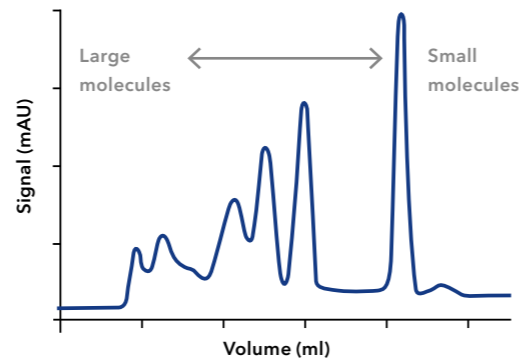
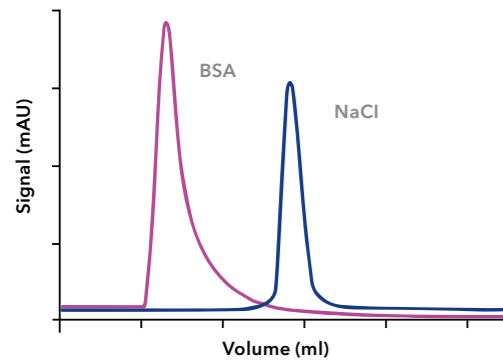
#### Group separation

Separation of small molecules from large molecules (e.g. **Desalting**)



#### High resolution separation

Separation of larger biomolecules within the fractionation range of the column matrix

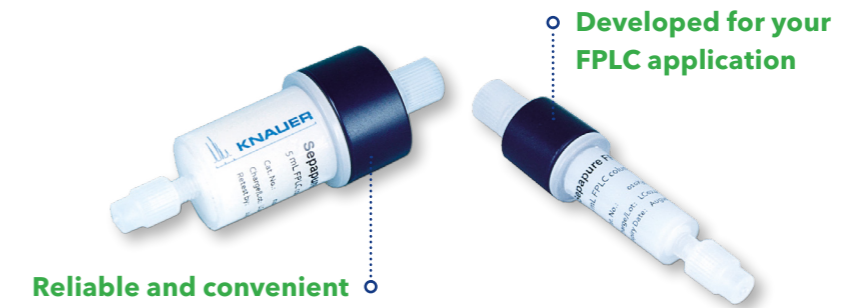


### Sepapure® Desalting columns

Prepacked 1 ml or 5 ml columns

#### Key features

- Dextran based beads with particle sizes ranging from 20 - 50 µm
- 5 kDa exclusion limit (all molecules bigger than 5 kDa are not retained)
- Recommended flow rates: 0.5 - 2 ml/min (1 ml column); 1 - 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Stored in 20% Ethanol



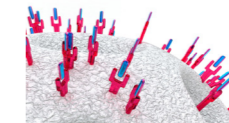
### Affinity Chromatography (AC)

In affinity chromatography a highly specific interaction between the biomolecule of interest and the column matrix is resulting in the enrichment of the biomolecule at the stationary phase during the loading phase. Byproducts can be easily washed

off in the wash phase. The elution of the target biomolecule is realized by washing the column with a buffer including a high amount of competing ligand or low pH.

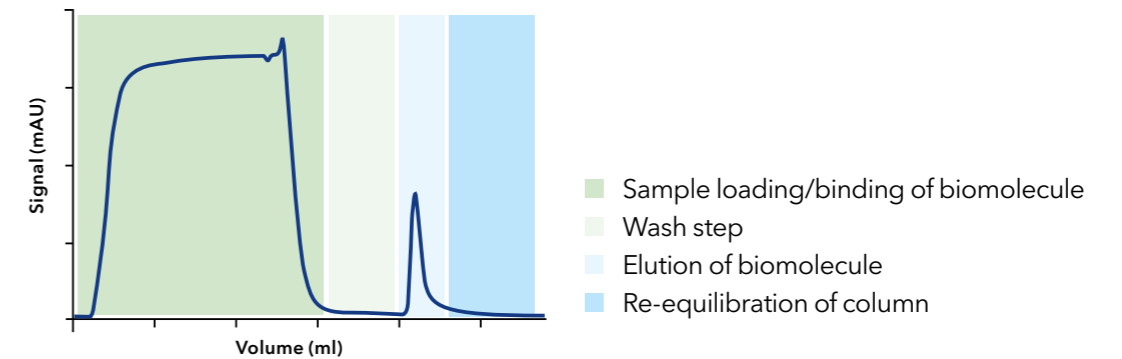
#### Recombinant tagged proteins

His - Tag via Ni-NTA column  
GST - Tag via Glutathione column



#### Antibodies and antibody fragments

via Protein A immobilized on column  
via Protein G immobilized on column



### Sepapure® Affinity columns

Prepacked 1 ml or 5 ml columns

#### Key features

- Agarose based beads with particle size of 100 µm on average
- Static binding capacity: Ni-NTA > 40 mg/ml; Glutathione > 10 mg/ml; Protein A > 30 mg/ml human IgG; Protein G > 15 mg/ml human IgG
- Recommended flow rates: 0.5 - 2 ml/min (1 ml column); 1 - 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Stored in 20% Ethanol

## Ion-Exchange Chromatography (IEX)

In ion-exchange chromatography biomolecules are separated according to their charge. Anion exchange is the method in which negatively charged molecules are binding to a positive matrix and in cation exchange positively charged

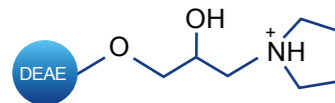
biomolecules are binding to a negative column matrix. The bound molecules are released from the matrix by a gradual increase in ionic strength of the elution buffer.

### Anion Exchange

Strong Anion Exchanger (Q)



Weak Anion Exchanger (DEAE)

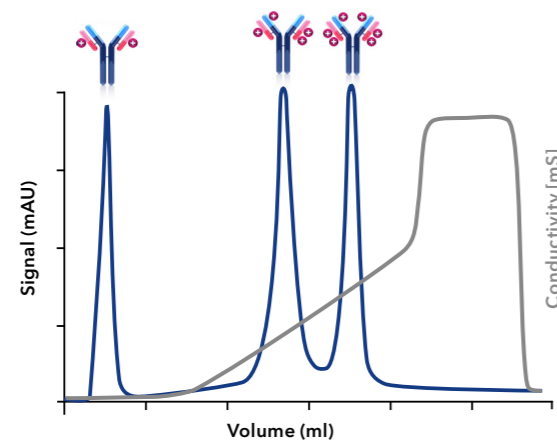
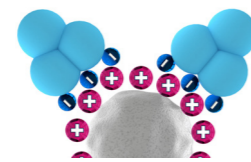
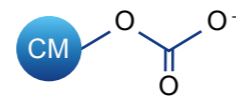


### Cation Exchange

Strong Cation Exchanger (SP)



Weak Cation Exchanger (CM)

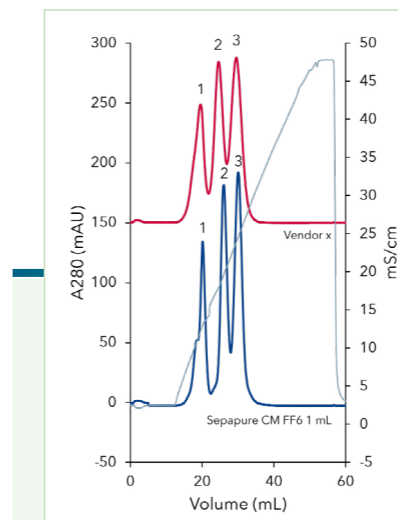


## Sepapure® Ion-Exchange columns

Prepacked 1 ml or 5 ml columns

### Key features

- Agarose based beads with particle size of 100 µm on average
- Ion capacity: 0.08 - 0.16 mmol/ml
- Recommended flow rates: 0.5 - 2 ml/min (1 ml column); 1 - 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Delivered in 20% Ethanol



### Comparison to other vendor

See information on detailed comparison of columns:  
[www.knauer.net/sepapure](http://www.knauer.net/sepapure)

## Sepapure® bulk material

Next to prepacked FPLC columns KNAUER also offers FPLC bulk media for high performance purifications from lab to large-scale protein purification.

In addition to the media used with the prepacked FPLC cartridges we also offer SEC resins for high resolution separations.

Resin Type / Volume	5 ml	10 ml	25 ml	50 ml	100 ml	150 ml	250 ml	500 ml	1000 ml
Glutathione	•		•		•		•	•	•
Ni-NTA			•		•		•	•	•
Protein A	•		•	•	•		•		•
Protein G		•	•						
IEX-Resins			•		•			•	•
SEC 75			•	•	•	•	•	•	•
SEC 200			•	•	•	•	•	•	•

## Sepapure® Size Exclusion media

### Key features

- Cross-linked agarose-dextran composite with a particle size of 35 µm on average
- Maximum pressure: 3 bar (SEC 75) or 4 bar (SEC 200)
- Separation range of Sepapure SEC 75: 3 - 70 kDa
- Separation range of Sepapure SEC 200: 6 - 600 kDa
- pH tolerance: 2 - 14 (short term) / 3 - 12 (long term)



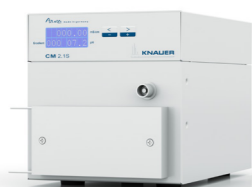
# Detection

We provide a choice of UV/VIS detectors, ranging from single variable wavelength to 8-channel diode array detector with 3D scan capability.



Detector	UVD 2.1S	MWD 2.1L	DAD 2.1L
	Compact and cost-effective variable single wavelength UV/VIS detector	Reliable multichannel UV/VIS detector	Diode array detector for peak purity check
Wavelength	190-500 nm	190-700 nm	190-700 nm
Channels	1	4	8
3D scan	n/a	n/a	+
Integrable in ASM	+		

More UV detectors available for your applications: [www.knauer.net/detectors](http://www.knauer.net/detectors)



### AZURA® Conductivity Monitor CM 2.1S

- Conductivity monitor for checking salt gradient
- Flow rates up to 100 ml/min
- 0.01 mS/cm-999 mS/cm
- pH option available

**Caution!**  
May cause higher back pressure

Flow cells for CM 2.1S				
<b>Analytical</b>	1/16"	10 ml/min	160 bar	30 µl volume
<b>Preparative</b>	1/16"	100 ml/min	100 bar	300 µl volume

## AZURA® Detector RID 2.1L

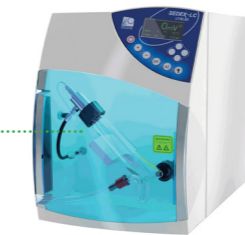
Refractive Index Detector for cost-effective, fast and reliable analysis of non-UV absorbent compounds.



Universal detection

A wide range of third-party detectors can be seamlessly integrated into AZURA® systems.

Gradient compatible and universal detection



### Light scattering detector

Using the unique Low Temperature technology, this Evaporative Light Scattering detector LC allows universal high sensitivity detection of non-UV active substances.

### Fluorescence detector RF-20A

The fluorescence detector RF-20A provides world-class sensitivity, excellent maintainability and diverse validation / support functions. It supports a wide range of applications from conventional to high-performance analysis.



**Caution!**  
May cause higher back pressure

Sensitive and selective fluorophor detection



The KNAUER interface box IFU 2.1 LAN allows precise analog data acquisition of third party modules.

## Flow cells

Select from an impressive range of easily exchangeable flow cells which cover a wide range of application. Optional fiber optics technology offers the possibility to separate the flow cell spa-

tially from the device providing enhanced security for hazardous, explosive or toxic work processes.

# Fraction collection

Collect large quantities or large numbers of fractions

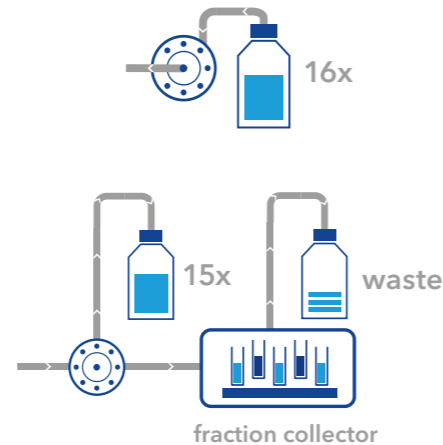
**Manually - collection by direct control**

**Volume-based - collection at defined volumes**

**Peak-based - collection according to detector signal**

## Outlet Valves

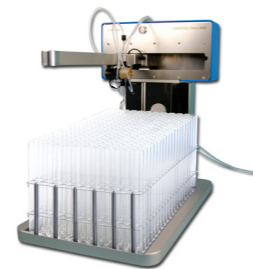
- Collecting large quantities ideal for flow-throughs and wash fractions
- Used as single unit for up to 16 fractions in an AZURA Bio Lab system or 8 fractions in an AZURA Bio Pilot system
- Valves can be daisy chained with a fraction collector



## Foxy Fraction collector

The Foxy R1 and Foxy R2 are versatile fraction collectors which fit to every purification need.

- Up to 125 ml/min for Foxy R1 and 1 000 ml/min for Foxy R2
- Wide choice of racks from 96-well microplates up to bottles or funnels
- Double capacity for Foxy R2 with automatic rack recognition
- Active cooling for Foxy R1
- Supported in software Puritychrom®
- Stand-alone operation
- Repeated collection in same vials



## Vario 4000 & Vario 4000 plus

The Vario 4000 is a more advanced fraction collector for demanding applications with high flow rates and a high number of fractions. Individual rack types are programmable. Just assemble your rack to your needs.





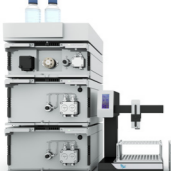
- For flow rates up to 1 000 ml/min
- High number of fractions
- Supported in software Puritychrom®
- Standalone operation possible

# Accessories

Accessory	Features	Benefit
 <p><b>Pressure Control</b></p>	<ul style="list-style-type: none"> <li>• Contains two pressure sensors</li> <li>• Automatic determination of pressure difference with Purity-Chrom®</li> <li>• Connect 1/16" or 1/8" tubings</li> <li>• Up to 250 ml/min and 60 bar</li> </ul>	Monitors pressure over the column bed and protects column from damage
 <p><b>Air Sensor</b></p>	<ul style="list-style-type: none"> <li>• Detect end of buffer or end of sample with PurityChrom®</li> <li>• Up to four air sensors per system</li> <li>• For transparent tubings with 1/16" or 1/8" or 1/4" outer diameter</li> </ul>	Protect column from air damage and support automation ( e.g. sample injection)
 <p><b>AZURA® Click</b></p>	<ul style="list-style-type: none"> <li>• Attach air sensor, pressure control, AZURA Organizer or your interface box to the side panel of your AZURA L device</li> </ul>	Organize your system.
 <p><b>AZURA® Organizer</b></p>	<ul style="list-style-type: none"> <li>• Attach columns from 5 mm to 26 mm diameter, falcon tubes, a back pressure regulator or a pH flow cell</li> </ul>	Organize accessories directly at the system and reduce dead volume
 <p><b>Back pressure regulator (BPR)</b></p>	<ul style="list-style-type: none"> <li>• Apply a constant back pressure to your system</li> <li>• Freely adjustable between 1-20 bar or 20-103 bar</li> </ul>	Prevent formation of air bubbles after the column which disturb detector signal
 <p><b>AZURA® Benchtop Rack</b></p>	<ul style="list-style-type: none"> <li>• Install AZURA systems at space-limited sites, especially in cold rooms.</li> </ul>	Space-saving solution for AZURA system setup



# AZURA® Bio purification systems

Product	Features	Page
<b>AZURA Bio SEC</b> 	0.001-10 ml/min, maximum 150 bar, injection valve sample for sample loops, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software	22
<b>AZURA Bio AC</b> 	0.01-50 ml/min, maximum 150 bar, selection valve for 8 buffers/samples, variable single wavelength UV-detector, fraction valve for 7 fractions and waste, PurityChrom® software	23
<b>AZURA Bio Lab</b> 	0.01-50 ml/min, maximum 50 bar, sample injections via sample loop and sample pump, variable single wavelength UV-detector, XY fraction collector, PurityChrom software (basic license). Exemplary System - configure your FPLC system based on your purification requirements	4
<b>AZURA Bio Lab</b> Advanced configuration 	0.01-50 ml/min, maximum 50 bar, sample injection via sample loop or sample pump, automated storage and reinjection of proteins possible, multichannel UV-detector, conductivity detector, outlet valve, XY fraction collector, PurityChrom Software	24
<b>AZURA Bio Pilot</b> 	Up to 1000 ml/min, sample pump for large sample volumes, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software in basic configuration. Configure your FPLC system based on your purification requirements. Scale-up is possible with same flexibility, software but minimal footprint.	5

## Components from lab to pilot

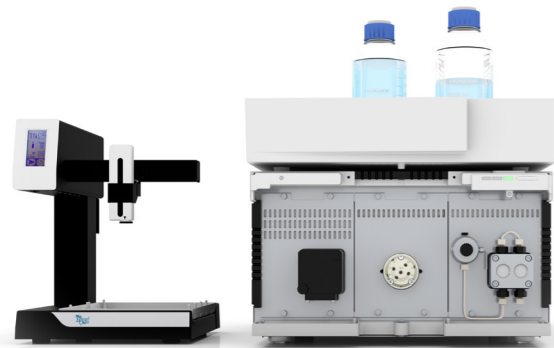
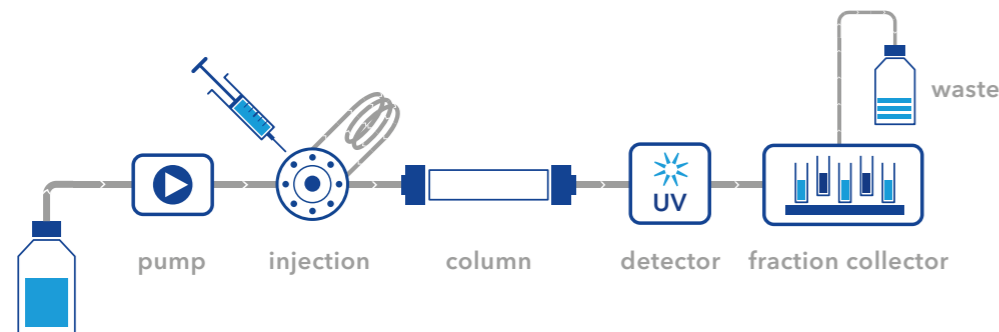
Product	Features	Page
<b>Buffer delivery</b>		
<b>Compact pump</b>	10 or 50 ml/min, isocratic	6
<b>Gradient pump</b>	10 or 50 ml/min, quaternary: selection of 4 buffers (A, B, C, D) Binary: selection of 2 buffers (A1, A2, B1, B2)	7
<b>Scale-up pump</b>	100, 250, 500, 1000 ml/min, binary to quaternary gradient	7
<b>Extended buffer selection</b>	With additional valves each for 8 buffers	6
<b>Sample selection</b>	For maximum 8 samples	10
<b>Columns</b>		
<b>Column selection valves</b>	For 2 columns, 5 columns and 5 columns with reverse flow option	11
<b>Sepapure® columns and media</b>	Columns and media for Affinity, Size Exclusion and Ion-Exchange Chromatography	12
<b>Detection</b>		
<b>Wide choice of detectors</b>	Variable single wavelength UV, multiple wavelength UV, full spectra diode array (DAD/3D Spectrum), conductivity and pH monitor, fluorescence, refractive Index	16
<b>Fraction collection</b>		
<b>Fractionation valve</b>	For 6 to 16 fractions, depending on the valve type with flow-rates up to 1000 ml/min	18
<b>Fraction collector</b>	From 96-well microplates up to bottles or funnels, up to 1000 ml/min	18
<b>Sample injection</b>		
<b>Injection valve</b>	1/16" tubing: up to 50 ml/min 1/8" tubing: up to 500 ml/min	10
<b>Sample pump</b>	10 or 50 ml/min	10
<b>Autosampler</b>	Up to 10 ml injection volume, from microtiter plates to 10 ml vials	10
<b>Software</b>		
<b>PurityChrom® software</b>	Highly flexible method writing, intuitive user-interface, volume- or time-based, with special features like system visualisation, hold & adjust option, extended threshold functions, check for impurities	26
<b>Safety features</b>		
<b>Accessories for protection and automation</b>	Air sensor, pressure control, back-pressure regulator, leak management, mounting solutions	19

# AZURA® Bio SEC system

Time consuming gel filtration runs?

AZURA Compact SEC systems take over time-consuming SEC methods in your lab without blocking your valuable FPLC system. Due to its compact design and intuitive FPLC software PurityChrom®, the system offers outstanding performance and

ease of use. Pre-designed methods are included in the software for the designated SEC system and can be easily adapted by changing the column volume. AZURA Compact SEC supports all columns available on the market.



### Key features

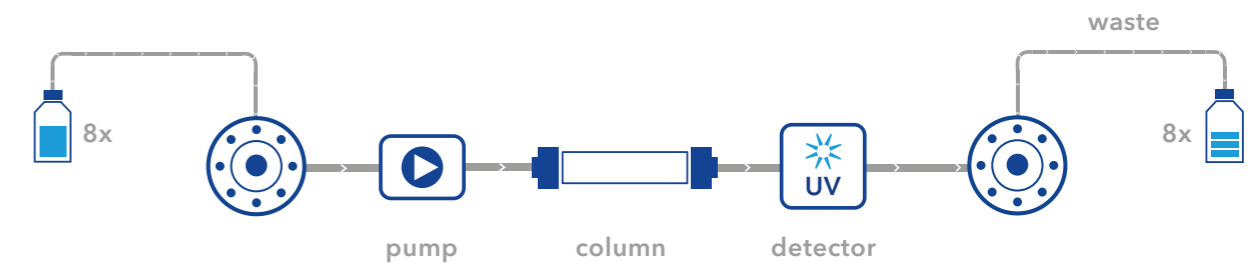
- Flow rate: 0.001 - 10 ml/min; 0.1 - 8.0 ml/min (recommended)
- Maximum system pressure: 150 bar
- Injection valve for sample injection via sample loop
- Variable single wavelength UV-detector (190 - 500 nm)
- Fraction collector for fractionation
- Columns from all vendors can be used
- PurityChrom® software

# AZURA® Bio AC system

For affinity chromatography

The AZURA Compact AC system qualifies for fast and reliable affinity chromatography. Select your sample, your washing and elution buffer using

the selection valve. Your proteins of interest are detected by UV and automatically collected via the fractionation valve.

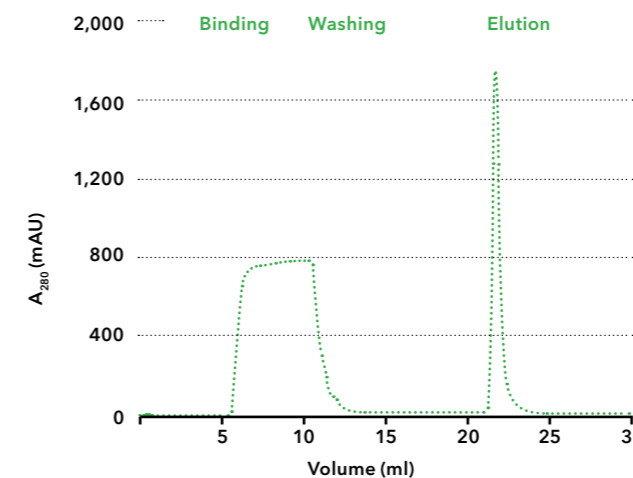


Use the selection valve for your buffers and sample.



### Key features

- Automatic sample/ buffer selection valve for up to 8 buffers or samples
- Fraction valve (8 ports) for fractionation
- Flow rate: 0.01 - 50 ml/min; 1 - 40 ml/min (recommended)
- Variable single wavelength UV-detector (190 - 500 nm)
- Columns from all vendors can be used
- PurityChrom® software
- Maximum system pressure: 150 bar



Protein purification based on high affinity Chromatogram & Legend

# Special configuration Two step purification

Special multicolumn chromatography solutions

Protein purification involves most of the times two to three steps:

1. capture step
2. optional intermediated step
3. polishing step

The transition from one to another step generally involves manual interaction and thus is time consuming. Automation by combining these steps increases the efficiency and optimizes the workflow. The quick and automated linkage of multiple

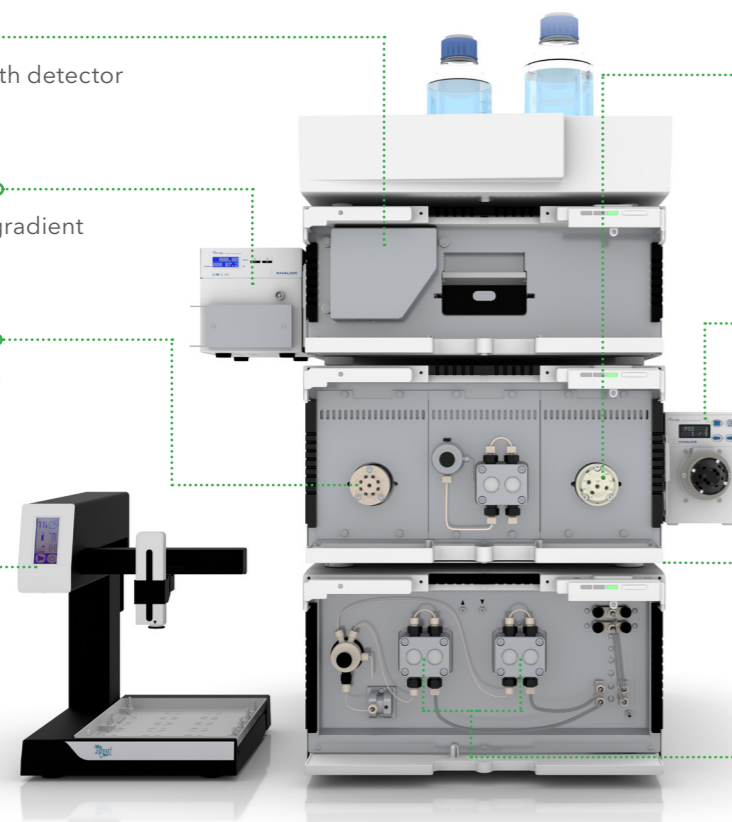
chromatographic purification steps into one method eliminates manual sample handling and minimizes time spent between steps. This automation strategy can be easily adapted to each purification task.

**Detection** ○  
Multiple wavelength detector

**Conductivity** ○  
Monitor your salt gradient

**Outlet valve** ○  
Collection of large volume fractions like flow through, wash fractions etc.

**Fraction Collection** ○

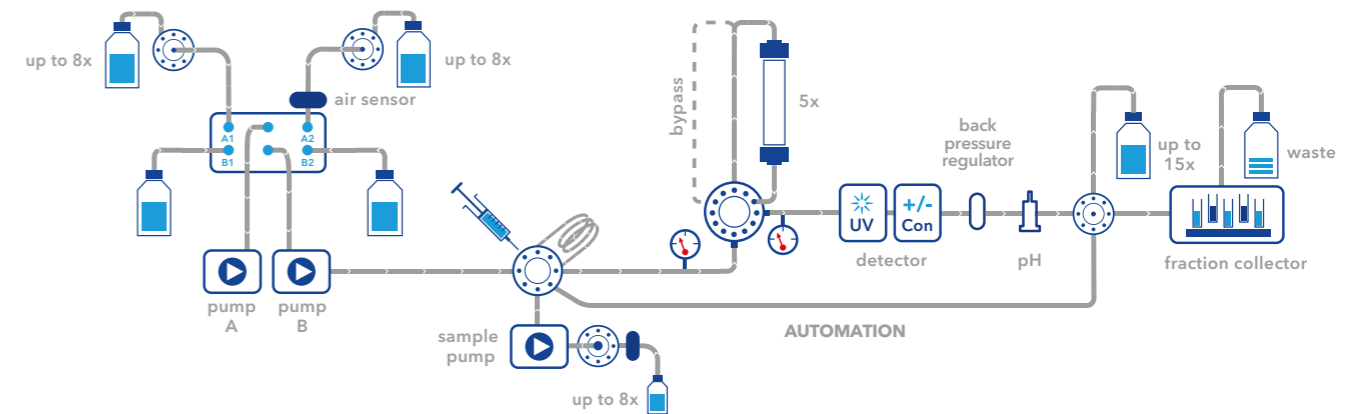


**Sample injection** ○  
For large and small sample volumes

**Column selection** ○  
Select between 5 columns and one bypass, reverse flow

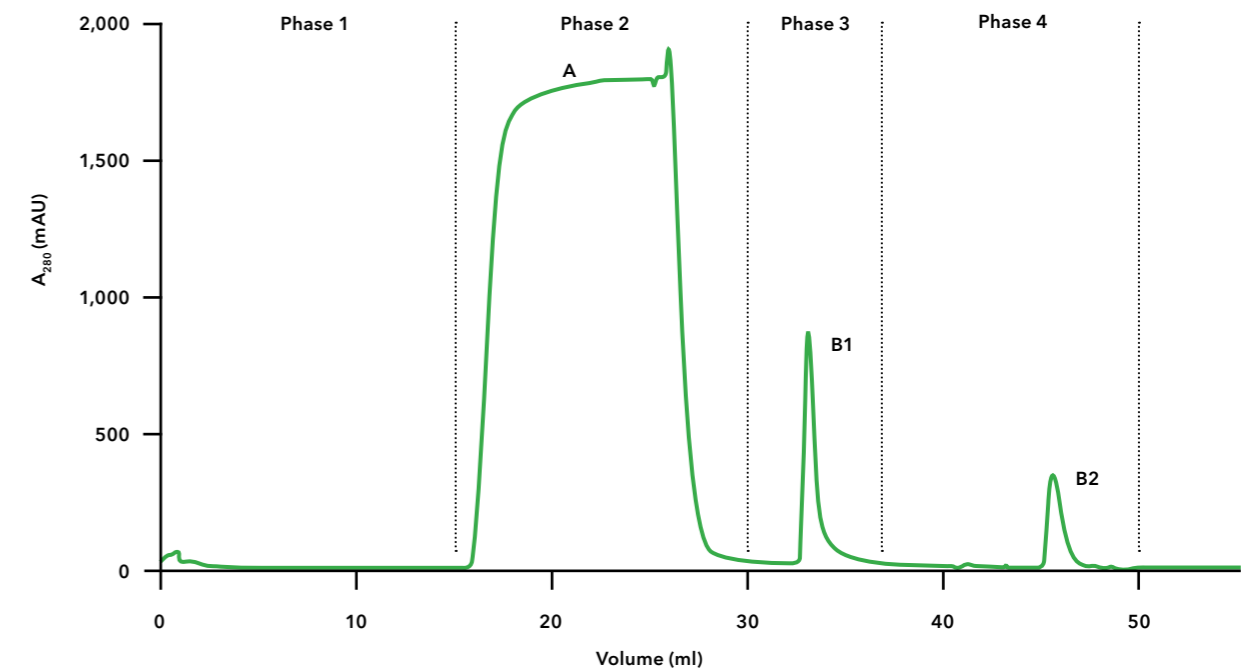
**Buffer selection** ○  
Select between 4 buffers

**Buffer delivery** ○  
System pump with binary gradient



**BUFFER SELECTION & DELIVERY**      **SAMPLE INJECTION**      **COLUMN SELECTION**      **DETECTION**      **FRACTION COLLECTION**

## Automated two-step purification of mouse IgG antibodies



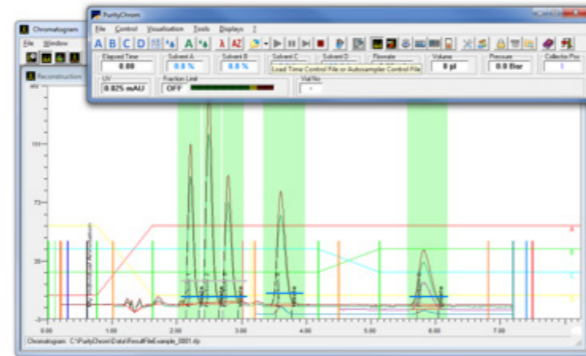
The affinity chromatography step was automatically combined with a gel filtration step to exchange the buffer of the purified mouse IgG antibodies; Phase 1: Column equilibration, Phase 2: Sample injection and washing, Phase 3: Elution of IgG from protein A column, Phase 4: Desalting of IgG



# Control your purification

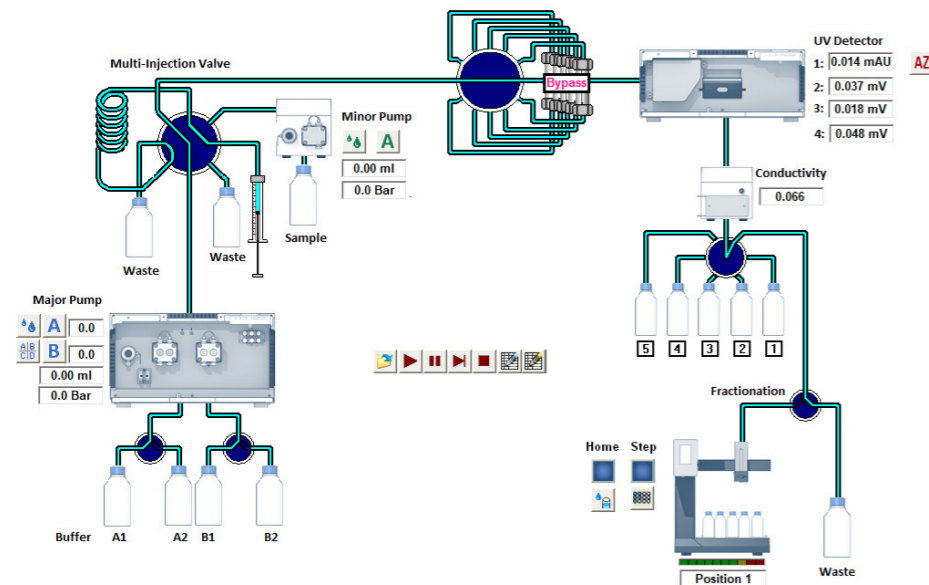
## PurityChrom®

Create methods with highest flexibility to realize complex applications. Offline licenses for creating methods and evaluating data are free of charge.



### System visualization

Keep an eye on your system by using the system visualization. The interactive flow path allows to control your system. Switch valves, start pumps, set autozero, start fraction collection and more with just one click.



### Hold & adjust (a running method)

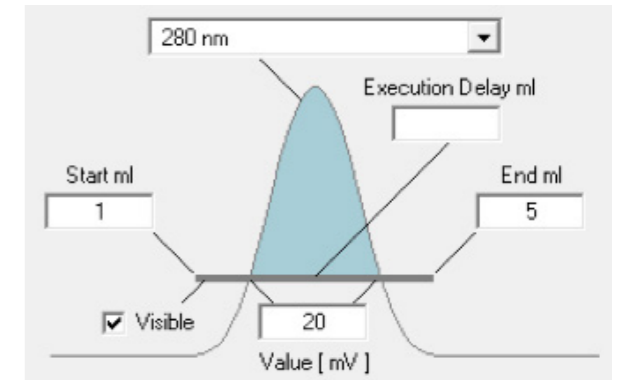
Stay always in control and change the parameters on the fly, even during a progressing method.



### Extended threshold functions

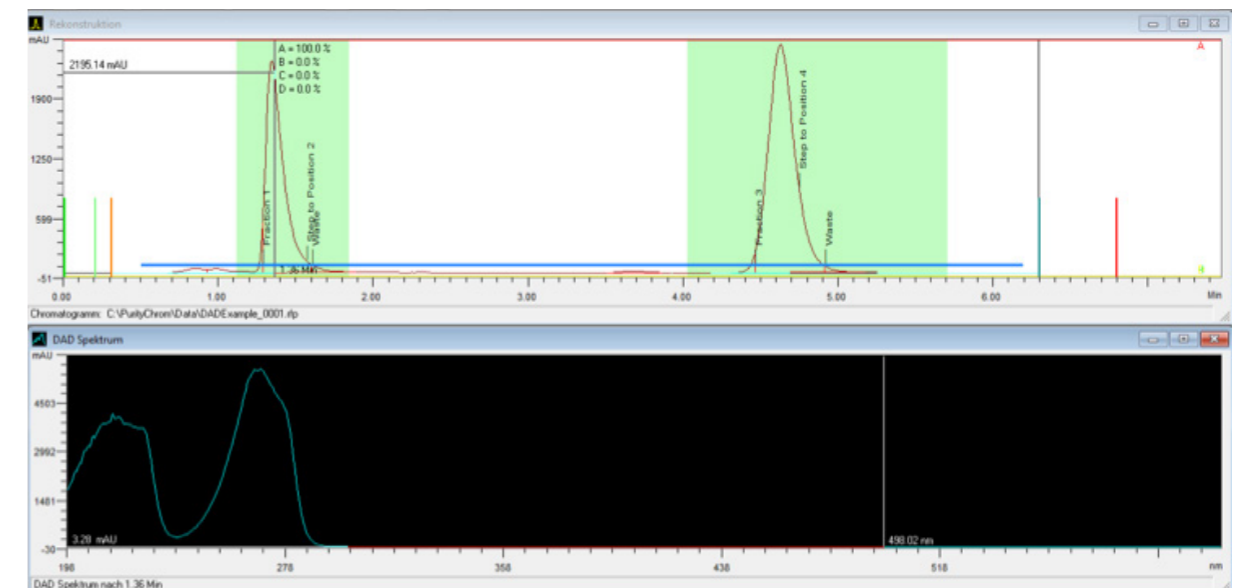
Automate any software function triggered by signals of any channel.

Automatically start fraction collection at the beginning of your desired peak. Protect the system from overpressure and air bubbles. After end of sample detection the software offers the possibility to automatically start or continue the run. Automate the whole purification starting from sample injection, via column washing to elution.



### Check for impurities - full spectra diode array (DAD)

Check the purity of your peaks based on the absorbance spectra anywhere in the elution profile.



## Tutorials on YouTube

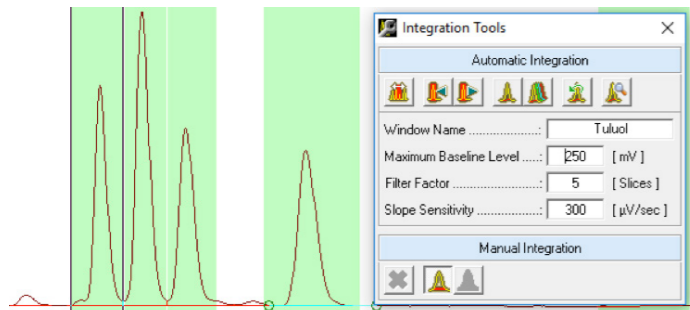
Get familiarized with manually controlling your system, writing methods and analyzing your data using PurityChrom®.

[www.youtube.de/KNAUERhplc](http://www.youtube.de/KNAUERhplc)



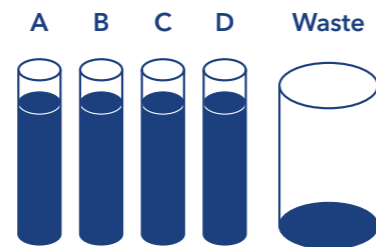
### Intuitive data analysis

Integrate peaks fully automatically or manually. Receive the peak results by clicking on one button.



### Solvent supply - calculate the consumption of buffers

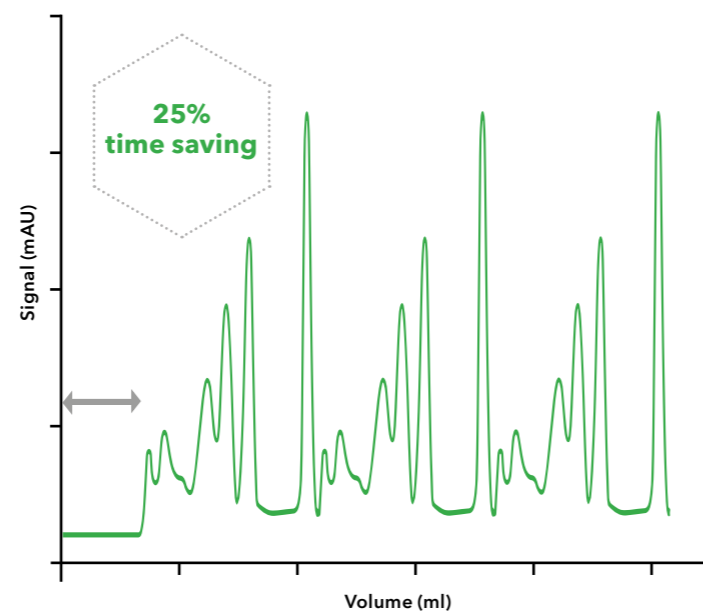
The solvent supply function calculates the consumption of buffers and the waste level for the current run, thus preventing the column from running dry and flooding the lab.



### Stacked Injection

Size exclusion chromatography separates the proteins according to their size. After selection of SEC medium, sample volume and column dimensions are the two most critical parameters that will affect the resolution of the separation. For most SEC runs the sample volume should not exceed 2% of the total column volume to achieve maximum resolution.

For larger sample volumes the sample must therefore be divided into different runs. However, this takes a lot of time and is not very efficient. With the stacked injection function in PurityChrom it is possible to run different runs automatically one after the other. The injection of the next run takes place during the current run, so that the time until the elution of the first peak can be fully exploited. This increases efficiency and saves time.



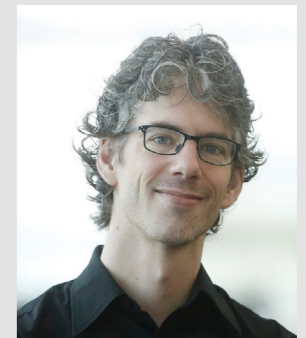
# Customer review

AZURA® Bio purification solution by KNAUER

„Our KNAUER FPLCs are the workhorses in the lab.“

“My lab studies the structure and function of membrane proteins. Due to the inherent instability of these proteins we purify them in the cold room. We needed robust FPLCs with good pumps that tolerated these conditions well.

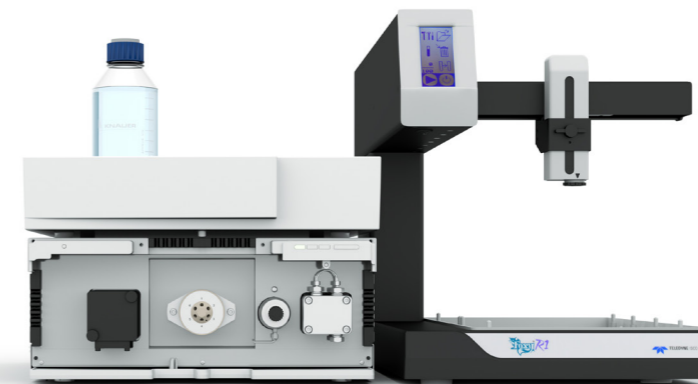
In addition, the systems needed to be easy to maintain. Knauer provided us with skilled advice on virtually every component of the system, ranging from tubing and pumps up to the software. Consequently, our systems are perfectly tailored to our needs. Most of the maintenance we can do ourselves. For remaining questions, we can rely on the great support Knauer offers. Our Knauer FPLCs are the nonsense workhorses in the lab. I highly recommend Knauer.”



Jun. Prof. Dr. Eric R. Geertsma  
Institute of Biochemistry,  
Goethe-University Frankfurt  
Photo: Uwe Dettmar

### System components

- AZURA® UV Detector UVD 2.1S
- AZURA® Valve Drive V 2.1S
- AZURA® Pump P 4.1S
- Foxy fraction collector



AZURA Compact SEC systems take over time-consuming SEC methods in your lab without blocking your valuable FPLC system.

Contact us:  
[sales@knauer.net](mailto:sales@knauer.net)

## Science Together



Based in Berlin, KNAUER is a medium-sized, owner-managed company that has been serving the sciences since 1962. We develop and manufacture scientific instruments of superior quality for liquid chromatography. The range includes sys-

Independent and family owned



The founder Dr. Herbert Knauer and his wife Roswitha are still active as advisers in the company to this day. The couple's daughter, Alexandra Knauer, has been managing director and



Worldwide partner in science since 1962

tems and components for analytical HPLC / UHPLC, preparative HPLC, fast protein liquid chromatography (FPLC), multi-column chromatography / simulated moving bed (SMB), and osmometry.



owner of the company since 2000. Several awards for outstanding products and innovations as well as entrepreneurial excellence make KNAUER a „leading employer“.

**We separate molecules and unite people.**

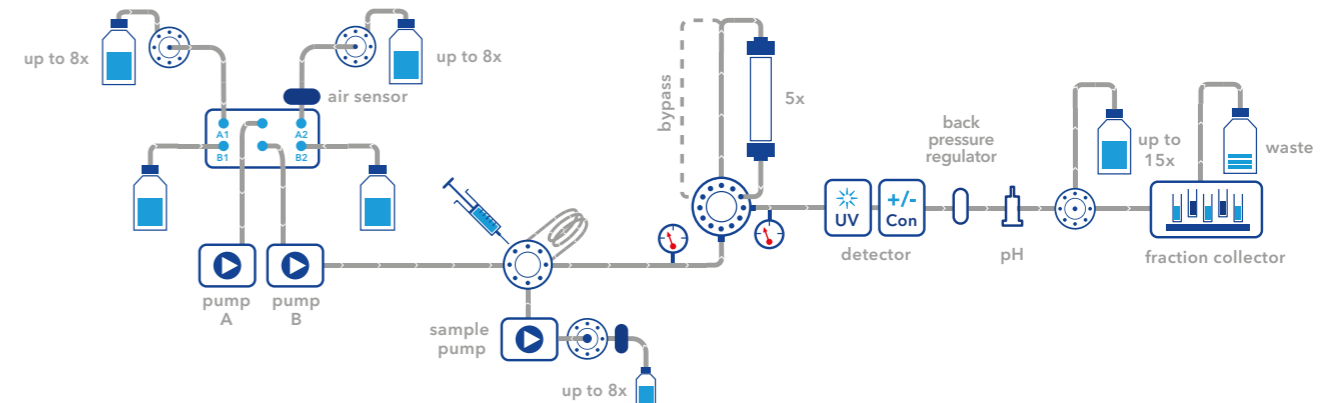
www.knauer.net



## System configurator Bio purification by KNAUER

### METHOD

- SEC**  
Size Exclusion Chromatography
- AC**  
Affinity Chromatography
- IEX**  
Ion-Exchange Chromatography
- HIC**  
Hydrophobic Interaction Chromatography



### BUFFER SELECTION & DELIVERY

- 10 ml/min binary gradient pump P 6.1L
- 10 ml/min quaternary pump P 6.1L
- 50 ml/min binary gradient pump P 6.1L
- ..... x 100 ml/min pump P 2.1L
- ..... x 250 ml/min pump P 2.1L
- ..... x 500 ml/min pump P 2.1L
- ..... x 1000 ml/min pump P 2.1L
- Ternary gradient module for pump P 2.1L
- Binary gradient module for pump P 2.1L
- ..... x Buffer selection valve (8 further inlets)

### SAMPLE INJECTION

- Multi-Injection valve
- ..... x Injection valve
- Sample pump module
- Sample selection valve: ..... x inlets
- Biocompatible Autosampler AS 6.1L

### COLUMN SELECTION

- Column selection valve up to 50 ml/min (5 columns, one bypass, reverse flow)
- Column selection (two columns or one bypass)
- Column selection high flow (5 columns, one bypass)
- Column selection high flow (5 columns, one bypass, reverse flow)

### DETECTION

- UV/VIS single wavelength
- UV/VIS multiwavelength
- Conductivity
- pH
- Fluorescence
- Refractive index
- Light Scattering
- Analog integration of further detectors

### FRACTION COLLECTION

- Outlet valve
- Foxy fraction collector with fixed rack types
- Labocol fraction collector with individual rack types
- Rack for fraction collector

### COLUMNS & MEDIA

- SEC**: Desalting ..... ml
- SEC**: SEC 75 ..... ml
- SEC**: SEC 200 ..... ml
- AC**: Protein A ..... ml
- AC**: Protein G ..... ml
- AC**: Ni-NTA ..... ml
- AC**: Glutathione ..... ml
- IEX**: DEAE - Weak anion exchange ..... ml
- IEX**: CM - Weak cation exchange ..... ml
- IEX**: Q - Strong anion exchange ..... ml
- IEX**: SP - Strong cation exchange ..... ml

### ACCESSORIES

- ..... x Air sensor main pump
- ..... x Air sensor feed pump
- ..... x Tubing 1/16"
- ..... x Tubing 1/8"
- ..... x Tubing 1/4"
- Pressure control (2 pressure sensors)
- ..... x Back pressure regulator
- AZURA Organizer
- Workstation (Windows)



Analytical  
HPLC

Multi-Column  
Chromatography,  
SMB

Preparative  
HPLC

FPLC

Osmometry

Dosing,  
Metering,  
Pumping

Detection

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