汉邦科技
Hanbon Sci. & Tech.

BIO-PHARMACEUTICAL DOWN-STREAM PURIFICATION EQUIPMENT

2018-2019

PRODUCT MANUAL



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H A N B O N S C I . & T E C H .

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01 *Bio-Lab*
Laboratory Chromatography System

Bio-lab Chromatography system is efficient, fast and it is totally developed by Hanbon with patents, applied to the rapid and efficient purification of proteins from microgram to gram, peptides and nucleic acids, etc. With a modular design, intelligent software and combined with columns, the system can meet the purification requirements of all kinds of biological macromolecules in the laboratory.

Product Features

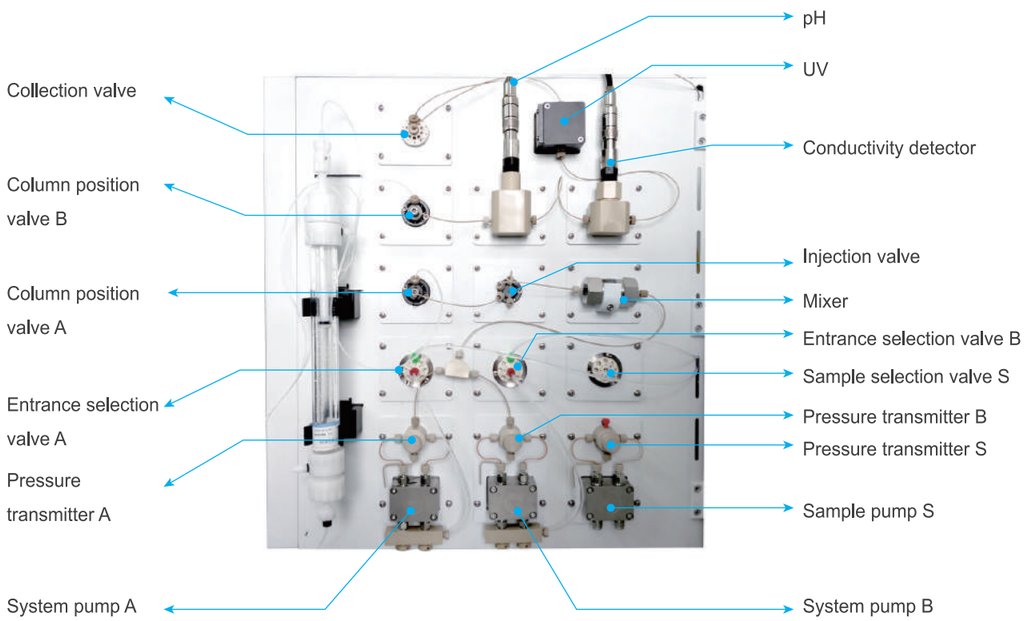
- High performance system pump, detector, mixer and all kinds of control valves ensure high accuracy and repeatability as well as achieving purification results more quickly.
- Modular design is very convenient for system maintenance and can also realize the flexible configuration updating along with system software, which can meet different accounts login.
- Stacked design of tubes can minimize dead volume and all the wetted tubes and parts have good biological compatibility, which will protect protein in all the processes.
- The software conforms to GLP/GMP and FDA 21CFR Part11 requirements.
- Perfect software functions; convenient operation
- The comprehensive validation documentation system (DQ/IQ/OQ/PQ) supports your GMP/FDA audit.

Bio-Lab Provides Three Types of Models

- Bio-Lab30 is applied to the purification of biomolecules from microgram to milligram, compatible with various pre-packed columns or small chromatography columns to facilitate small amount of protein fast purification in labs.
- Bio-Lab 100 is applied for the purification of biomolecules from milligram to gram, which can meet purification demand of lab research and multi-user.
- Bio-Lab 300 are applied to protein purification at small scale.

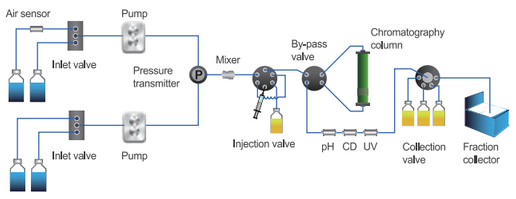


Bio-Lab Chromatography System Configuration Drawing

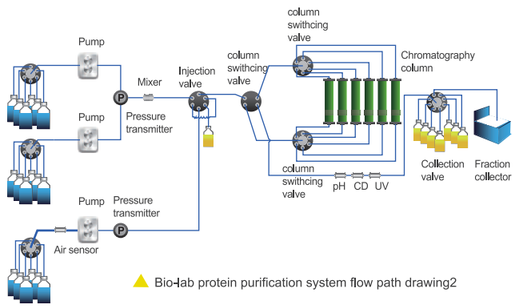


As shown above, all modules of the system are installed on the same plane, which can reduce the dead volume and is convenient for the experimenter to operate.

Bio-Lab chromatography system flow path in lab



Bio-lab protein purification system flow path drawing1



Bio-lab protein purification system flow path drawing2

—Function Introduction of the main components in Bio-Lab chromatography system

System pump



Material is optional: PEEK, titanium alloy or 316L stainless steel. All of them have a good compatibility with biological samples. Pump head has a self -washing function, which can stop salt and something else from being separated out at the head, and then avoid the damage or pollution to instrument. Besides, the pump adopts an electronic pressure pulsation compensation design for the gradient accuracy and repeatability to get the reproducibility.

Column position valve



We have the single column position valve and multi-position valve. The former is applied to controlling the buffer flow direction, and the by-pass function is integrated to clean the system with the column on. The multi-position valve can connect the maximum 6 chromatograph columns simultaneously, and the flow path can be automatically switched between different columns to avoid the risk of bubbles into the system during the columns switching, which is also convenient for packing material selection.

Inlet valve



The inlet valve provides two buffer entry options: 2*2 and 2*6, to select different buffers and elution online automatically. So it can also ensure that the cleaning buffer is always online. So the column and system can get cleaned automatically with it.

Injection valve



Various injection modes can match with the valve without changing the way of pipeline connection, such as loop injection, injection pump, system pump injection.

01

Bio-Lab

Laboratory Chromatography System

—Function Introduction of the main components

Detector



A UV-Vis detector has dual channels or four channels and wavelength is adjustable, range: 200-400 or 190nm to 700nm; The light source is deuterium lamp or tungsten lamp. Both of them have high sensitivity, reliability, durability and automatic correction, no need to preheat when starting up. Multi-channels can help detect contaminants, such as nucleic acid in proteins, or special tagged proteins, and target protein molecules that have no absorption value at 280nm. pH/ conductivity detectors are internationally famous brands. Especially the conductivity detector is matched with a temperature sensor for temperature compensation and online calibration.

Fraction collector



Controlled by Bio-Lab software, it can collect components according to time, volume or automatic peak recognition, stable and reliable performance, simple operation, wide application scope, small volume and light weight. What's more, the fraction collector is flexible, adopting an original motion principle: linear motion combined with rotary motion. The collection pipe can get to any collection location rapidly to have more collection ways. The precise minimum pipeline design reduces dead volume and the collection inaccuracy caused by samples spreading after the flow cell. It can broaden the function of temperature control to keep sample stable.

Outlet valve



The outlet valve can automatically control the liquid to the fraction collector, waste or other outlet, such as large volume collection port.

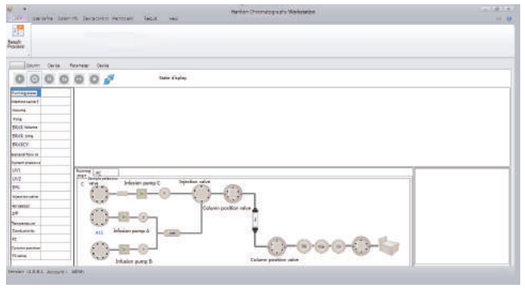
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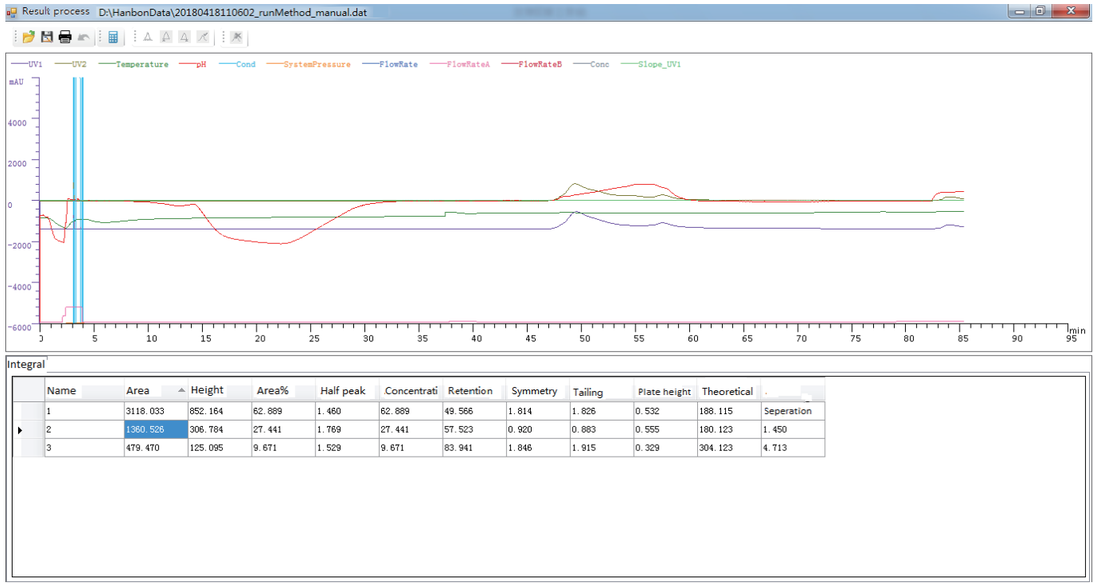
Bio-Lab

Laboratory Chromatography System

—Bio-lab workstation software

It's specially developed for low pressure chromatography by Hanbon with patents, conforming to the GLP/GMP rules and 21 CFR Part11 requirements. Bio - Lab has built-in method edit, manual or automatic control, data analysis module, easy to master and highly intelligent.





Name	Area	Height	Area%	Half peak	Concentrati	Retention	Symmetry	Tailing	Plate height	Theoretical	.
1	3118.033	852.164	62.889	1.460	62.889	49.566	1.814	1.826	0.532	188.115	Seperation
2	1360.526	306.784	27.441	1.769	27.441	57.523	0.920	0.883	0.555	180.123	1.450
3	479.470	125.095	9.671	1.529	9.671	83.941	1.846	1.915	0.329	304.123	4.713

Bio-Lab has modular design and visible flow path, which makes each running and operation easier and faster.
Multiuser privilegelogin, operation record tracking and digital signature ensure the reliability and security of data;

Bio - Lab has simple and convenient method edit module and data processing module. It can quickly calculate the integration, compare the batch process of curve and evaluate the column effect, convenient for the best process development.

01 **Bio-Lab**
Laboratory Chromatography System

Bio-Lab Standard Configuration Parameter

Model	Bio-Lab 30	Bio-Lab 100	Bio-Lab 300
System Pump	Binary piston pump, PEEK, titanium alloy or 316 L stainless steel, good biological compatibility; pump head self-washing function prevents pollution and salting out, and electronic pressure fluctuation compensation measures provide excellent gradient accuracy and repeatability for lab chromatography system to ensure the reproducibility		
Flow Rate	0.001~29.999ml/min	0.01~99.99ml/min	0.01~299.99ml/min
Pressure	≤30MPa	≤20MPa	≤15MPa
Flow Rate	±0.5%		
Gradient Model	Linear, isocratic, and stepwise elution gradients which modify the gradient ratio online		
UV Detector	Two channel UV detector, deuterium lamp (standard), tungsten lamp (optional)		
Wavelength Range	200-400nm or 190-700nm		
Absorbance Range	-5~5Au		
Wavelength Accuracy	±1		
Optical Path Data	1、2、5、10mm		
Conductivity Detection Range	1~999 ms/cm		
pH Detection	0~14		
Mixer	0.6、2、5、10、15ml		
Valve	Basic Configuration: injection valve, single column position valve, outlet valve. Advantages: minimum dead volume design; Modular design of valve head and the drive part; tight joint to fix tubes; easy to maintain. The sample injection valve can choose manual or automatic mode, with a loop of 100ul, 500ul, 1ml, 5ml, 10ml , 50ml or150ml.		
Fraction collector (optional)	1) 120 test tubes (height 90 ~ 180mm, diameter 13 ~ 15mm) 2) 80 test tubes (height 90 ~ 180mm, diameter 18mm) 3) Funnel plate and the collection quantity are not limited.		
Software Workstation	The modular design is easy to operate. User rights establishment, audit trail and data records all comply with GMP/GLP requirements. Powerful method editing and data processing function.		

01 **Bio-Lab**
Laboratory Chromatography System

Optional Configuration Parameter

Detector	
UV Detector	Single channel detector, four-channel detector, 190-700nm
Differential Refractive Detector	RI-501、RI-502、RI-504
Valve	Electromagnetic/ rotor valve
Outlet Valve	4- channel outlet valve or 8- channel is optional
Multifunctional Column Position Valve	4-channel column position valve or 6-channel or 8-channel is optional.
Sample Pump	High accuracy piston pump
Flow Rate Range	0.01-49.99/0.01-99.99/0.01-299.99ml/min
Pressure Range	0~20MPa
Chromatography Column Holder	Applied to 1ml, 5ml pre-packed column and 6.6-50mm diameter chromatography

LCC series chromatography columns in lab

- Applied to lab-scale biopharmaceutical R & D
- Easy operation with good biocompatibility
- Self-adjustable column volume
- A temperature jacket is included
- Configuration parameter



Type	ID (mm)	Tube Height (mm)	Max Pressure (bar)
LCC16/20	16	200	5
LCC16/40	16	400	5
LCC16/70	16	700	5
LCC16/100	16	1000	5
LCC26/20	26	200	5
LCC26/40	26	400	5
LCC26/70	26	700	5
LCC26/100	26	1000	5
LCC50/30	50	300	5
LCC50/70	50	700	5
LCC50/100	50	1000	5
16 column packer	16	/	5
26 column packer	26	/	5
50 column packer	50	/	5
16 adapter	/	/	5
26 adapter	/	/	5
50 adapter	/	/	5

02

Bio-Pro

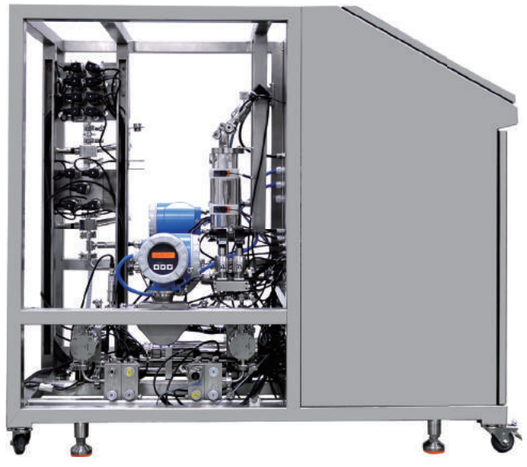
Pilot & Process Chromatography System

——*Pilot and Industrial Production Scale*

Bio-Pro automatic chromatography system is applied to the pilot and industrial production of bio-pharmaceutical purification process. Based on the requirements of ASME BPE and GMP, the system adopts an integrated module design which can realize multi configurations according to the specific requirements of customers. In this system, many processes can be manually or automatically carried out, stable and reliable, such as conditioning, injection, flush, elution, auto-collection, CIP, etc. Besides, we can provide you with complete verification documents which are consistent with GMP.

Product Features

- Key parts are from imported top brands, stable and reliable
- ASME BPE pipeline design; the inner wall electric throwing(Ra≤0.4um); automatic welding
- Wetted material meets USP Class VI and FDA standards.
- System Control software uses GE or SIEMENS Configuration software model , meeting the requirements of FDA 21CFR Part11
- Complete GMP verification documents and service



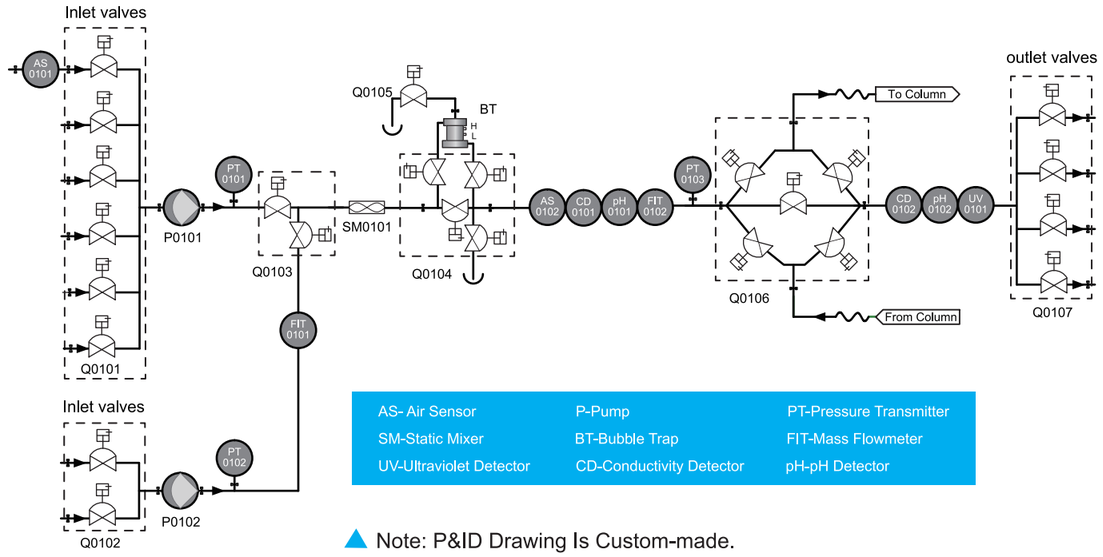


02

Bio-Pro

Pilot & Process Chromatography System

Standard Gradient System P&ID Drawing

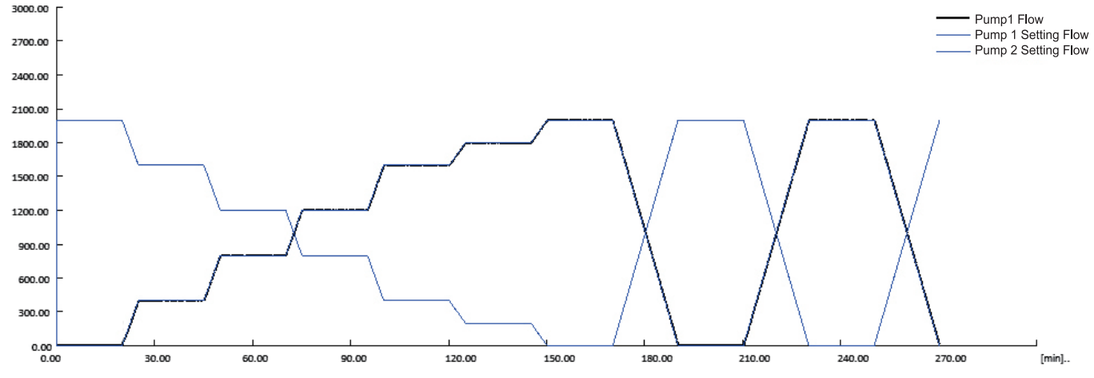


AS- Air Sensor	P-Pump	PT-Pressure Transmitter
SM-Static Mixer	BT-Bubble Trap	FIT-Mass Flowmeter
UV-Ultraviolet Detector	CD-Conductivity Detector	pH-pH Detector

▲ Note: P&ID Drawing Is Custom-made.

High Precision Flow Control

Accurate control of flow and gradient can be achieved by precise PID feedback loop adjustment.



▲ Gradient chromatogram

02

Bio-Pro

Pilot & Industrial Protein Purification System

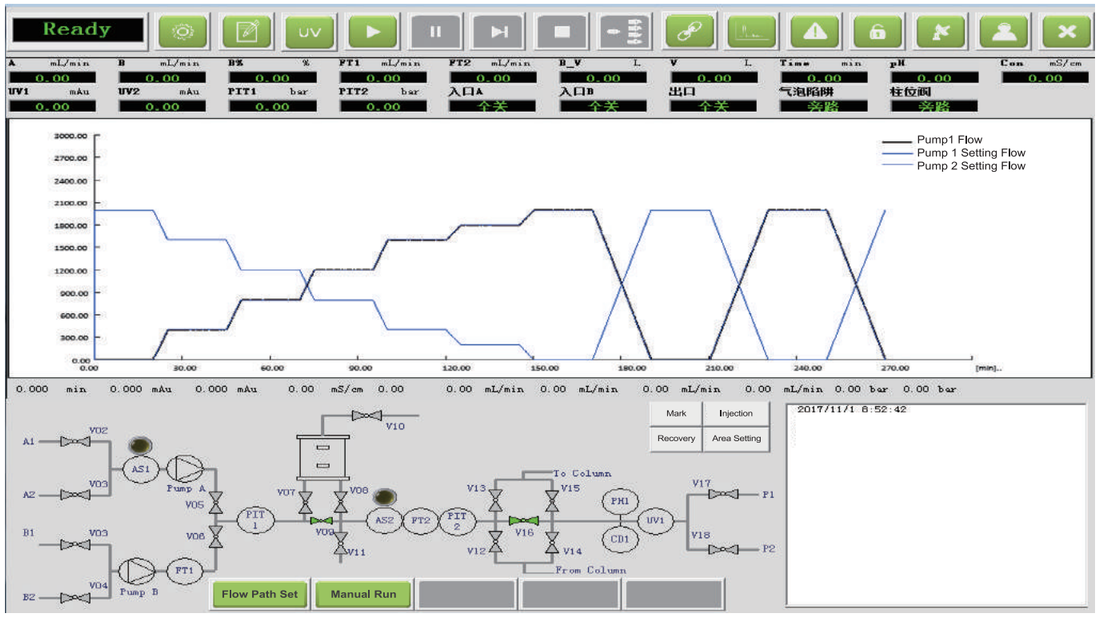
Bio-pro System Software

The system software can track production process and set parameters, including flow rate, valve switching, injection time, elution time, collection conditions, etc. It can run automatically according to the preprogram or can run manual mode with user-defined process and parameters. Designed according to the requirements of GMP and FDA 21 CFR Part11, the software has audit trail, electronic record, electronic signature, multi-level password management and other functions.

Product Features

- Monitor all running parameters; set 4 levels alarm, such as pressure, bubble, etc.
- Good operation interface to achieve various functions
- Multi-mode operation: debug mode, manual mode, automatic mode
- Multi-level authorization administration
- Multi-task hyper-threading data processing; fast response and processing
- Complete audit trail function and data operation log
- In accordance with GAMP 5, FDA 21 CFR Part11, electronic signature and electronic records

Bio-pro System Software Interface



02

Bio-Pro

Pilot & Process Chromatography System

System Parameter Table

Mode	Bio-Pro 60	Bio-Pro 180	Bio-Pro 600	Bio-Pro 1200	Bio-Pro 1800	Bio-Pro 4400
Infusion Pump	High-accuracy constant-flow pump	Sanitary quaternary diaphragm pump				
Flow range(L/h)	1～60	1~180	6~600	10~1200	45~1800	150~5000
Flow accuracy(L/h)	0.3	0.5	1.5	3	5	10
Tubing	1/4"TC (OD6.35 X ID4.57)	3/8"TC (OD9.53 X ID7.75)	1/2"TC (OD12.7 X ID9.4)	3/4"TC (OD19.05 X ID15.75) 1"TC (OD 25.4 X ID 22.1)	1"TC (OD 25.4 X ID 22.1)	1½" TC (OD38.1 X ID34.8)
Tubing Material	SS 316L(ASME BPE), Electro polishing Ra≤0.4um					
System pressure(bar)	6					
Detector	Single wavelength, double wavelengths or four wavelengths(200-400nm or 190-700nm)					
Conductivity range	0.00001~300 ms/cm					
PH range	0～14					
Power supply	220VAC 50Hz				380VAC 50Hz	
Power(KW)	1		1.5		5	
Work Temperature	4~40					
Compression air(bar)	5~7					
Size(mm)	1100x700x1200	1370x700x1200	1370x750x1350	1370x750x1350	1800x1200x1800	1800x1200x1800
Weight(kg)	220	280	450	450	630	700

03

MCC
Manual Chromatography Column

MCC adopts the compression way by manual screw to load packing materials, with the advantages of concise configuration , easy for cleaning and manual operation, applied to the switching among diversified products. The chromatography column has compact structure, convenient operation and stable performance. It can meet the requirements of most chromatography packing materials, and has good column packing effect and high column performance from the pilot to the large-scale production in demand.

MCC includes 2 designs –---MCC-B(manual sealing) and MCC-Q(automatic sealing, pneumatic deblocking), for the various requirements from different users.

Product Features

- Imported Schott finishing glass tube with high strength, easy to seal
- Column head sideslip design, no need for manual handling
- The frit can be replaced directly at the bottom without the need to disassemble the cylinder.
- Original and highly reliable column head sealing---- manual or automatic
- Convenient, reliable and safe operation
- No dead zone in flow path, excellent cleaning performance
- Imported wetted material, according with USP Class VI and FDA.
- GMP validation files and best services



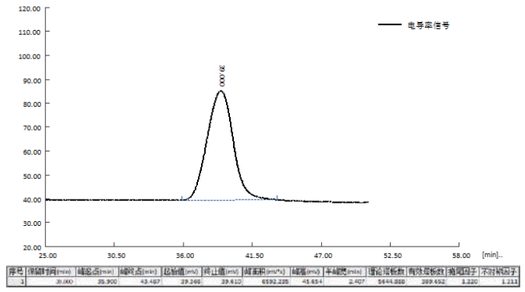
03

MCC
Manual Chromatography Column

Structural Innovation



Column Performance Testing Diagram



Packing material:Sepharose 4 Fast Flow
Chromatography column:MCC100
Test system: Bio-lab 60 chromatography system
Balance:0.4 mol/L NaCl
Sample:2mol/L NaCl
Elution:0.4 mol/L NaCl

Configuration Parameter

Item	MCC-70	MCC-100	MCC-140	MCC-200	MCC-300	MCC-400	MCC450
Column Tube ID(mm)	70	100	140	200	296	400	450
Column Height(mm)	500/ 750/ 950						
Packing Height(mm)	0 ~ 450	50 ~ 450					
	200 ~ 700	300 ~ 700					
	400 ~ 900	500 ~ 900					
Max Work Pressure(bar)	7	7	6	5	3		
Mesh Size(um)	10/ 23(PP)				10/ 20(SS316L)		
Work Temperature	4 ~ 40℃						
Operation Mode	Manual						
Inlet & Outlet Diameter(mm)	1/4" TC (OD6.35× ID4.57)		3/8" TC (OD9.53× ID7.75)			1/2" TC (OD12.7× ID9.4)	
Weight(kg)	28/30/32	34/37/40	42/47/52	57/64/71	146/156/166	191/206/221	259/271/280
Dimension(mm)	280×280×900 280×280×1150 280×280×1350	400×480×1330 400×480×1580 400×480×1780	400×480×1370 400×480×1620 400×480×1820	420×580×1360 420×580×1610 420×580×1810	640×640×1430 640×640×1680 640×640×1880	880×880×1320 880×880×1570 880×880×1770	940×940×1370 940×940×1620 940×940×1820

Remark: 1. MCC450 : Imported acrylic column tubes 2. The height and pressure of chromatography columns can be custom-made.

04

ACC
Automatic Axial Compression Column

ACC series automatic axial compression column is specially designed for bio-pharmaceutical purification. The smart packing method can ensure each packing effect is consistent and chromatographic results are repeatable, which can reduce the risk caused by the large difference in packing effect of each batch during production and can avoid the dependence on operators. ACC series is applied to most types of chromatography packing material and the corresponding packing methods in the bio-pharmaceutical industry to meet the production requirements of diversified products.

Product Features

- Equipped with automatic workstation for packing, unpacking and cleaning, easy to maintain
- Key components are international top brand.
- The upper and lower position of the column are protected by software, photoelectric sensor and machine for the equipment reliability and personnel safety.
- Patented piston seal design, better sealing performance.
- Patented piston exhaust structure design, convenient and quick
- Scientific distributor structure design to ensure the average distribution of liquid.
- High precision servo motor drive with high operation accuracy to ensure the piston position error is as low as 0.1mm.
- Sanitary design, no dead angle; Wetted material: consistent with the USP VI or FDA and other pharmaceutical regulations requirements.
- The cylinder is made of imported acrylic or stainless steel column, and the cylinder can be rotated to facilitate the removal and cleaning of the frit.



Column Effect Test Drawing

Packing material：Sepharose 4 Fast Flow

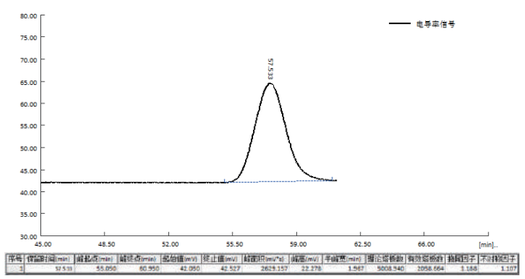
Chromatography column：ACC 450

Test system：Bio-pro 180 chromatographic system

Balance：0.4 mol/L NaCl

Sample：2mol/L NaCl

Elution：0.4 mol/L NaCl



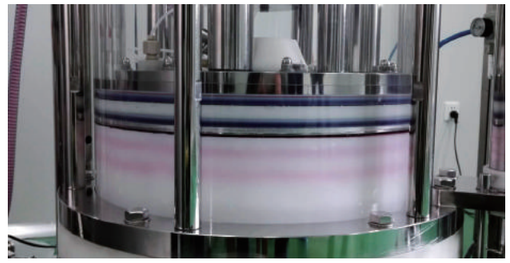
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ACC
Automatic Axial Compression Column

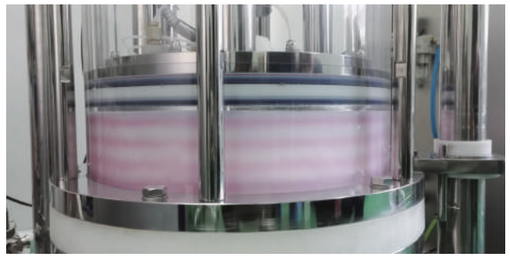
Structural innovation



Distribution test



▲ VB12 injection Twice



▲ VB12 Injection 4 times

Configuration Parameter

Model	ACC300	ACC400	ACC450	ACC600	ACC800	ACC1000	ACC1200	ACC1600
ID (mm)	296	400	450	600	800	1000	1200	1600
Tube height (mm)	600							
Recommend Packing Height (mm)	50-300							
Recommend packing volume	3-20	6-37	8-47	14-84	25-150	39-235	56-339	100-603
Max work pressure	4							
Frit pore size	10、20(SS316L)							
work temperature	4～40							
Axial compression method	Automatic - electric motor axial compression							
Inlet and outlet diameter	3/8" TC (OD:9.5 ID:7.75)	1/2" TC (OD:12.7 ID:9.4)		3/4" TC (OD:19.1 ID:15.8)	1" TC (OD:25.4 ID:22.1)		1.5" TC (OD:38.1 ID:34.8)	
Compressed air	5~7							
Weight	305	415	555	880	1985	3675	5615	7815
External dimension	70x70x230	72x72x235	73x73x248	90x90x248	145x115x274	162x128x279	186x150x313	222x195x330

Note: 1. ACC300/400 column tubes can be Schott glass tube. 2. The diameter, height and pressure of columns can be customized.

05

SCC

Automatic Spraying Chromatography Column

SCC series automatic chromatography column uses upper and lower spray design to realize packing, unpacking and cleaning functions. The unique spray structure design ensures the average distribution of packing material, high column effect and no stratification.

SCC series automatic chromatography column is applied to most types of chromatography packing material and the corresponding packing methods in the bio-pharmaceutical industry to meet the production requirements of diversified products.

Product Features

- Matched column packing workstation; You can choose automatic mode or manual mode for column packing, unpacking and cleaning; simple and convenient to maintain.
- Key components are international top brands.
- Patented piston seal design ensures better sealing performance.
- Scientific distributor structure design ensures the average distribution of the liquid.
- The sanitary design can guarantee a complete cleaning, with no corner missed, and the wetted materials comply with the USP VI or FDA pharmaceutical regulations.
- Column tube materials are imported acrylic or stainless steel tube (antiseptic treatment is optional).



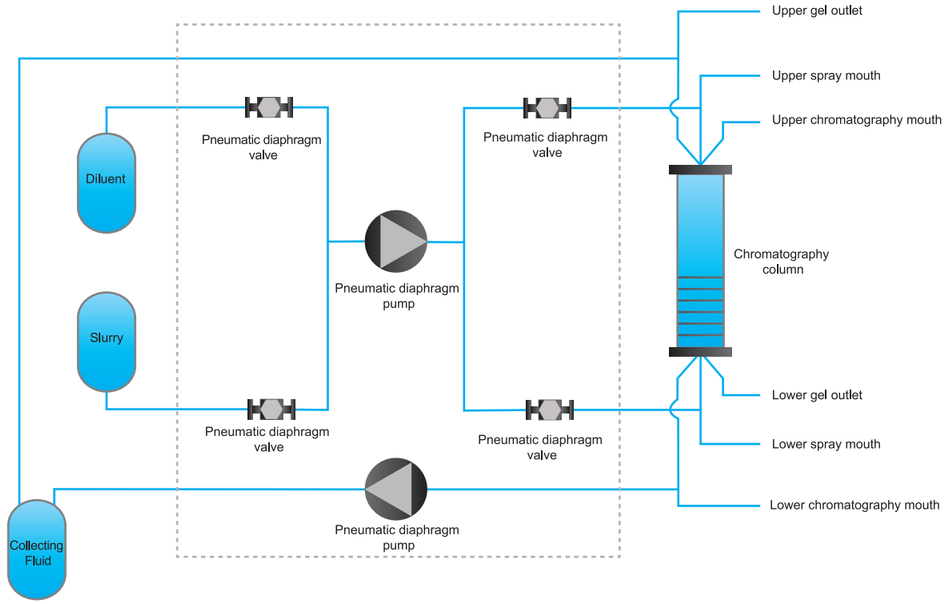


05

SCC

Automatic Spraying Chromatography Column

Automatic Spray Chromatography Column P&ID Diagram



Configuration

Item	SCC-600	SCC-800	SCC-1000	SCC-1200	SCC-1600
Column ID (mm)	600	800	1000	1200	1600
Column height (mm)	700				
Recommend packing height (mm)	140-350				
Recommend packing volumn (L)	40-100	70-175	110-275	160-400	280-700
Maximum pressure (bar)	5				
Inlet and outlet diameter	1"TC (OD 25.4 X ID 22.1)			1½" TC (OD38.1 X ID34.8)	
Frit pore size (μm)	10,20, etc. (SS316L)				
Weight (KG)	375	610	930	1215	1815
External dimension (cm)	80x80x156	100x100x157	120x120x157	140x140x160	180x180x160

Note: Column of other diameter, height and pressure can be customized.

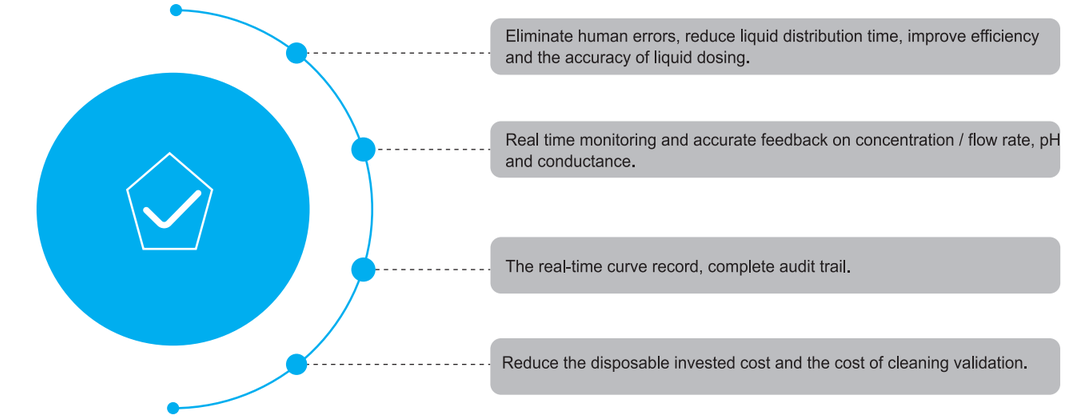
06

Bio-Con

In-line Buffer Conditioning System

Bio-con on-line dilution dosing system solves the demand for the accuracy and repeatability of the complex buffer solution in the biopharmaceutical process. In addition, it can reduce the quantity of the liquid / storage tank, save the manpower and material resources, and reduce the production cost.

Technical Advantage



The new building

- Reduce 60% area of liquid dosing and storage
- Reduce 90% volume of the dosing and the storage tank
- Reduce 60% staff
- Reduce the 70% cost of dosing time.

The built factory

- Reduce the cost of cleaning and verification of liquid dosing and storage tank
- Increase the accuracy of the liquid dispensing and reduce the labor cost
- Increase the scale of liquid dosing and 3 times of the productive power

06

Bio-Con

In-line Buffer Conditioning System

Technical Principle

The basic principle of Bio-Con on-line dilution dosing system is to mix a variety of concentrated buffers, including acid, alkali, salt and so on, with the injection water to make the buffer solution needed. According to the specific use conditions, different concentration can be accurately controlled.

And in this system, the stability of the control parameters can be reached within 1min.



▲ *System entrance*

▲ *Bio-Con*

▲ *System exit*
Chromatography
Ultra filtration

The Bio-Con on-line dilution dosing system can also be integrated into a Bio-Pro chromatography system or the Bio-TFF tangential flow filter system, which can continuously complete the process of liquid dispensing + chromatography or liquid dispensing + tangential flow, and the overall control and data record will increase the convenience for the customer purification process.

06

Bio-Con

In-line Buffer Conditioning System

Liquid Dosing Experiment

We have done the experiment for many times on the buffer system used in common bio- pharmaceutical purification, such as phosphate system, acetate, citrate system, Tris-HCl system and so on, which achieved excellent online dilution effect. The steady time ≤1min ,pH ±0.05, conductivity±0.05 or 1% (take large value) solution with high accuracy in the actual experiment.

Configuration Parameter

Model	Bio-Con180	Bio-Con600	Bio-Con1200	Bio-Con5000	Bio-Con9000
Flow range	1-180 L/h	6-600 L/h	10-1200 L/h	150-5000 L/h	300-9000 L/h
Flow accuracy①	±1%/0.5L/h	±1%/1.5L/h	±1%/3L/h	±1%/10L/h	±1%/20L/h
Dilution multiple of main buffe②	5-20times				
Liquid dispensing accuracy	Maximum PH accuracy ≤0.05, conductance accuracy≤0.05ms/cm or ≤±1%(take large value)				
UV detector	Single wavelength, double wavelength, or four wavelengths 200-400nm or 190-700nm				
Valve switch	Compressed air drive				
Tubing material	316LSS (ASME BPE) ,Ra≤0.4μm				
System pressure resistance	6 bar				
Power Supply	220VAC			380VAC	
Power	1.5KW	2KW	2KW	5KW	5KW
Public facilities	Compressed air 5-7bar				

Remarks:

① The flow accuracy 1%/0.5L/h takes the larger value as the criterion and takes the average value.

② Refers to the dilution multiple of phosphate, Tris and other main buffers, and the dilution ratio of buffer for PH adjustment or conductance can reach 200 times or higher.

07

Bio-TFF

Automatic UF/DF system

The Bio-TFF system is an automatic ultrafiltration UF/DF system which is easy to be operated, it's very suitable for the development of biomedical technology, pilot research and small-scale production. Bio - TFF system's innovation and intelligent design not only can improve process performance but also can realize very low minimum operating volume, the largest ultrafiltration concentration ratio and the best product recycling function.

According to the specific using process of the customer, intermediate circulation tank from 10L to 500L tank is optional for the Bio-TFF system, and the circulation tank and system adopt split design, which will not affect the system operating volume. With manual mode or automatic mode, this system can realize automatic CIP, liquid concentration, equal volume filtration, automatic collection functions, etc. It is an ideal device for monoclonal antibodies, vaccines, blood products and other biological macromolecules to concentrate and wash.

Product Features

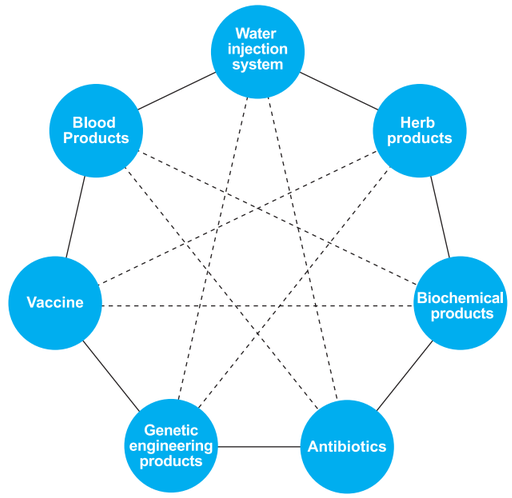
- Sanitary design, conforming to GMP and ASME BPE requirements.
- Quattroflow quaternary diaphragm pump, low shear force, low pulse.
- Automatic TMP control, automatic concentration, equal volumn filtration, etc.
- Comply with FDA 21 CFR Part11 requirements.
- Custom-made.
- GMP validation files and services.
- Either membrane package /hollow cored iber is optional

Application Field

Dalcoholization, Concentration and metal ion removal of albumin, Globulin and other blood products.

cell culture solution clarification; the virus solution concentration and filtration; buffer solution heat source removal.

Protein concentration; Buffer solution replacement; Bacteria collection.



Water system heat source removal, Sterilization and clarification

Herb injection heat source removal; Macromolecule removal; Material solution clarification; Polysaccharide molecule separation

Protein concentrate and filtration; Macro and micro molecule separation

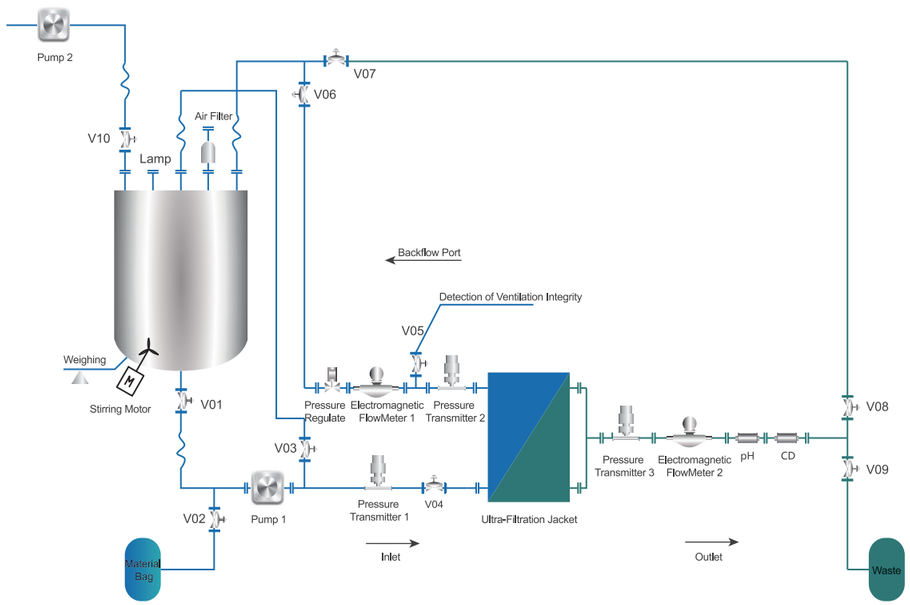
Fermentation solution clarifica-tion; Antibiotic API heat source removal; Macromolecule impurities removal

07 **Bio-TFF**
Automatic UF/DF system

Automatic Ultra-filtration System Figure



Automatic Ultra-filtration System P&ID Diagram



07 **Bio-TFF**
Automatic UF/DF system

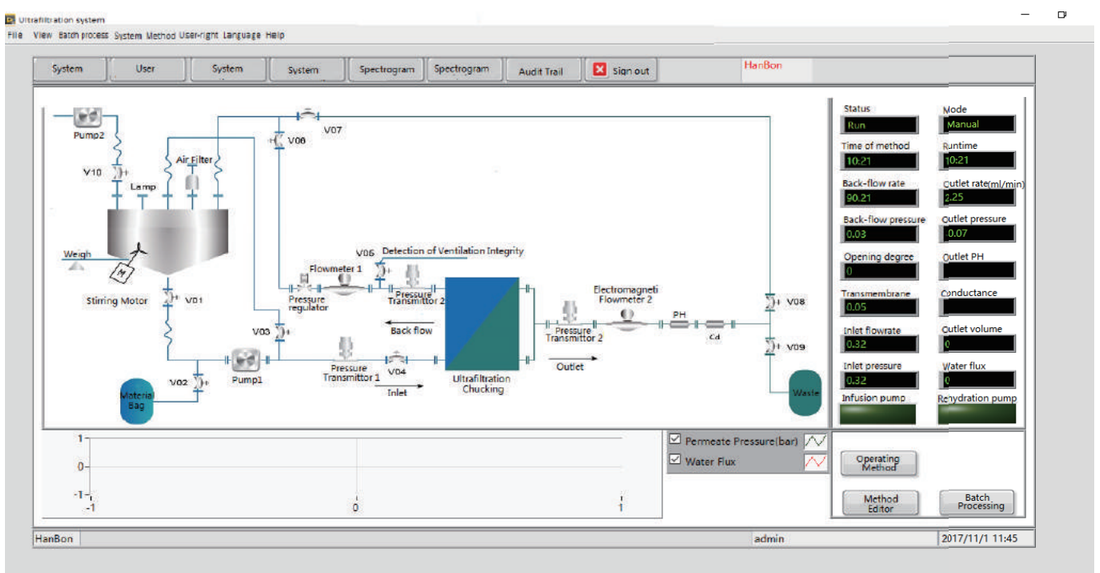
Software Instruction

The software meets the requirements of GAMP5 and FDA 21 CFR Part 11. According to the process, operation parameters can be prepared, including the liquid volume, system flow, inlet\ backflow\ outlet pressure, TMP control, △ P, liquid weight inside the tank, etc. Each parameter in the process of the equipment has a special file record, and the chromatogram is drawn in real time for reference of the operator.

Product Features

- Monitor all running parameters, set level 4 alarm, such as pressure, conductivity, etc.
  Good operation interface, convenient to realize various functions.
- Multi-mode operation--- debugging mode, manual mode and automatic mode.
- Comply with GAMP5 and FDA 21 CFR Part 11, conform to electronic signature record.
- The system is divided into four levels of operation authority to avoid arbitrary change of process parameters by operators.
- The system can edit the method to realize automatic CIP, concentration, filtration and other functions.
- Complete audit trail function, perfect data operation log.

Software Interface



07

Bio-TFF

Automatic UF/DF system

Ultra-filtration Assembly- jacket

- Adaptive for mainstream brands membrane package such as GE/PALL/Sartorius.
- Special flow inlet and outlet design ensures the system cleaned thoroughly.
- Standard 316 sanitary low carbon stainless steel, all connections are sanitary interfaces.
- Various configuration can realize customized processing from research and development to pilot production scale.

Membrane Package Area



▲ Adaptation:0.1-0.5㎡



▲ Adaptation:0.5-3㎡

Configuration Parameters

Item	Bio-TFF180	Bio-TFF800	Bio-TFF1200	Bio-TFF4400	Bio-TFF9000	Bio-TFF20000
Circulating pump	Sanitary quaternary diaphragm pump				Sanitary rotor pump	
Pump rate (L/H)	1~180	6~800	10~1200	150~5000	300~9000	600~20000
Filtration area (m^2)	0.1~0.5	0.1~2.5	0.5~2.5	0.5~10	1~20	2~40
pH range	0~14					
CD range (ms/cm)	1~999					
Tubing material	SS316L(ASME BPE),Ra≦0.4μm					
Solvent mixing tank (L)	Optional (20/30/50/100 and others)					
Fluid infusion pump	Optional					
System pressure (bar)	≤6					
Power	220VAC 50Hz			380VAC 50Hz		
Compressed air (bar)	5~7					

Note: Hanbon can also provide the ultrafiltration system Bio-HF with the hollow fiber column.
This configuration parameter table is also applied to the hollow fiber ultrafiltration system.