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Analytical®
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DAC-800

Dynamic Axial Compression

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Analytical Technologies Limited

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DAC preparative liquid phase system design diagram
The overall layout and dimensions of the system can be customized according to the customer's site

Dynamic Axial Compression Chromatography Column System (DAC)

The dynamic axial compression column system is the core component of the preparative liquid phase system. It consists of a column support, piston, column tube, hydraulic cylinder, and hydraulic operation console.

Infusion system

The solvent delivery system includes an infusion pump and delivery pipelines, regulating valves, liquid flow direction switching valves,instruments,etc.The gradient is low-pressure gradient mixing with a gradient range of 5-95% and a gradient accuracy of ≤±1.5%.

Online control and monitoring system

The control unit consists of a positive-pressure explosion-proof electrical control cabinet, housing the motor inverters that drive the solvent and sample pumps,the core control unit (MCU), the driver board, and the display unit. The control system utilizes a Siemens PLC system and can communicate with the DCS. It features three modes: debug, manual,and automatic.

Collection system

The collection system is mainly divided into overflow, emptying, waste collection, and sample collection. Collection can be based on time or peak height; collection valves are connected in series to minimize dead volume.

Homogenization system

The homogenization system can provide a maximum homogenization volume of 400L. The system is powered by a gas source or an electric power source, and the speed during homogenization can be adjusted.

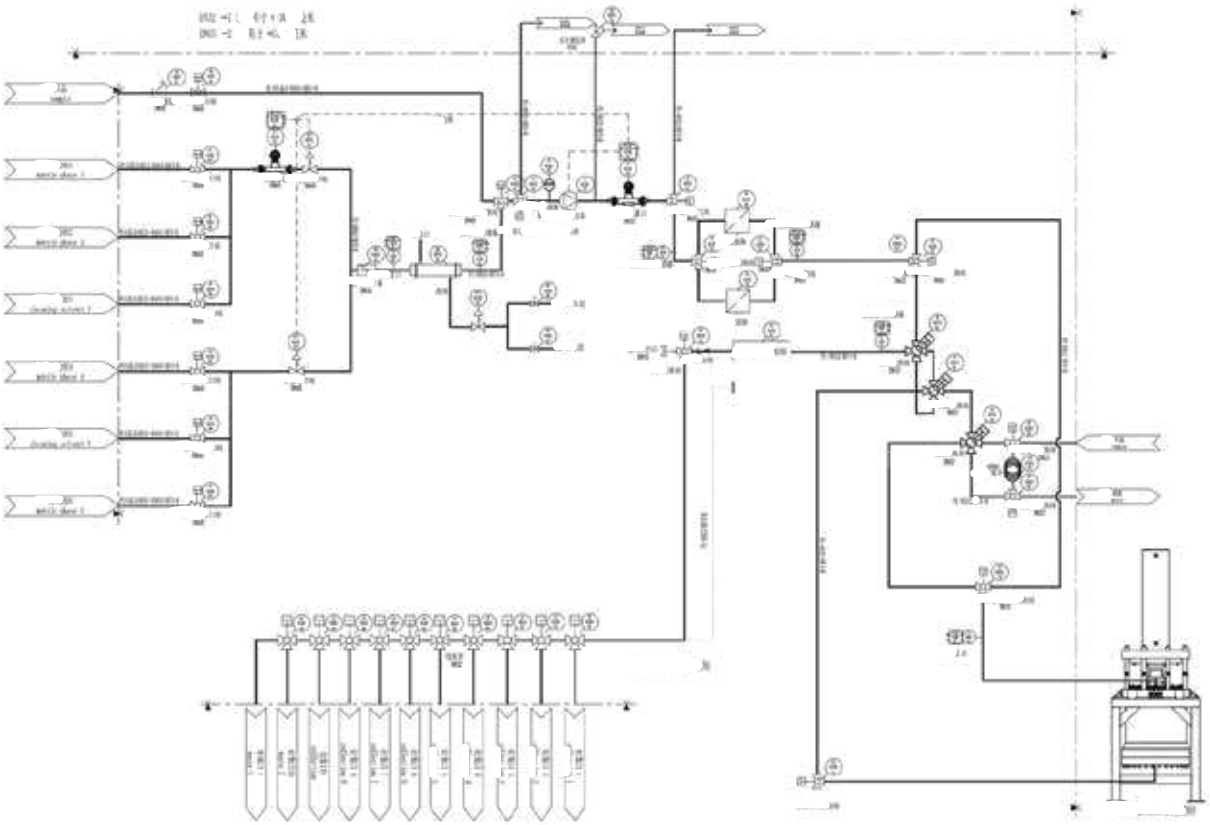
Control software

The control software was developed specifically for industrial high-pressure preparative chromatography. The system complies with FDA Part II requirements and provides features such as inspection tracking and user-level review. The software utilizes a graphical control interface, providing a clear system piping diagram and a concise, practical interface.

Auxiliary systems

The auxiliary system includes a manual valve for column installation,a tool kit,a hydraulic lift, a disassembly auxiliary device for the piston and column bottom, a piston tray, etc.

System Design Schematic Diagram:

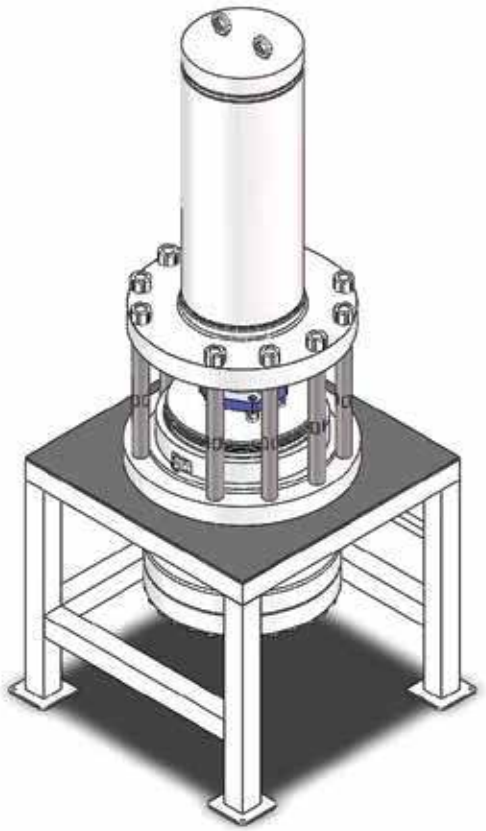


The overall layout and dimensions of the system can be customized according to the customer's site.

Dynamic Axial Compression Column:

It pack and use preparative columns larger than 100mm in diameter,conventional axial compression technology cannot meet the high separation requirements. Currently,the most advanced method is dynamic axial compression technology. Dynamic axial compression technology uses piston movement to complete column packing, column pressure maintenance, and column unloading. A specially designed seal around the piston allows the piston to slide freely along the column tube while maintaining a high sealing pressure. Piston movement and pressure maintenance are powered by a hydraulic system. This hydraulic power is more stable and uniform than traditional spring-powered axial compression columns,resulting in improved column performance. Large preparative columns can be packed while maintaining separation performance

comparable to analytical columns. A hydraulic station drives the piston movement, ensuring safe and reliable pressure maintenance. Separated from the chromatographic column, it prevents leakage and contamination. This ensures smooth and uniform piston movement, eliminating the impact force caused by intermittent oil supply from the pneumatic pump. Easy to operate, column packing and unloading takes only about 5 minutes.This system allows for automated column unloading,combining the functions of a chromatographic column and a column packer. It offers high column efficiency, excellent reproducibility,and stable durability.Meet the high-intensity work requirements 24 hours a day, 365 days a year.



DAC technical parameters

No.	Name	Models	Technical Parameters
1	frame	Integral frame	Material 304, welding, brushed surface, no sharp corners, burrs
2	Column tube (integral forging)	Material	316L
		Inner diameter	800mm
		length	650mm, effective height ≥450mm
3	Structural parts	Inner wall processing technology	Honing, polishing, electrolysis
		Inner wall surfaceroughness	Ra≤0.2um
		Maximum column bed height	400mm
		Maximum working pressure	10MPa
4	Piston mechanism	Flanges, supports, clamps, etc.	304 material
		Material	316L
		Allocation method	316L forced distributor
		Stencil material	316L woven metal mesh
		Stencil aperture	2um (imported brand)
		High pressure sealing ring material	Modified PTFE
		High pressure sealing ring structure	Axial spring preloaded V-ring seal
		Guide ring material Material	PTFE
5	Column base mechanism	Material	316L
		Collection method	316L forced collector
		Stencil material	316L woven metal mesh
		Stencil aperture	2um (imported brand)
		High pressure sealing ring material	FEP+VMQ
		High pressure sealing ring structure	Coated O-ring
		Connection method	High-strength bolt connections
6	hydraulic cylinder	Hydraulic cylinder bore	500mm
		Piston rod diameter	2 0 0mm
		journey	1 0 00mm
		Maximum working pressure	18MPa
		Rated pressure	40MPa
7	Hydraulic power system	Pneumatic pump	Air consumption MAX900LN/min, 22kw
		Security protection	Overpressure protection function,emergency stop switch; grounding interface, operation button to preventmisoperation

7	Hydraulic power system	Operational Control	Switch the direction of the hydraulic cylinder
			(up,down) Control pump output pressure
		Pressure control	Air pressure and oil pressure during operation
		Pressure display	Special pneumatic pump for pressure
			maintenance,pressure maintenance locking valve
		Pressure assisted hold	220L
		Fuel tank capacity Remark	none
8	fastener	Connection and sealing	High-strength bolts
9	auxiliary equipment	Toolkit	Special tool kit
		Disassembly and assembly assistance	Piston and column bottom flange disassembly
			and assembly system, including hydraulic lift,
			turner, and piston tray
10	Mobile phase tubing	Metal wrapped PTFE hose	Outer layer 304 metal mesh with protective
			cover, inner layer PTFE tube, joint 316L,
			pressure resistance 8Mpa
All parts in contact with materials are made of 316L, PTFE, PEEK, FEP, and material certificates are included.			

The dynamic axial compression chromatography column mainly consists of a frame mechanism,a column tube mechanism,a piston mechanism,a column base mechanism, and a hydraulic system.

3.3.1 Framework

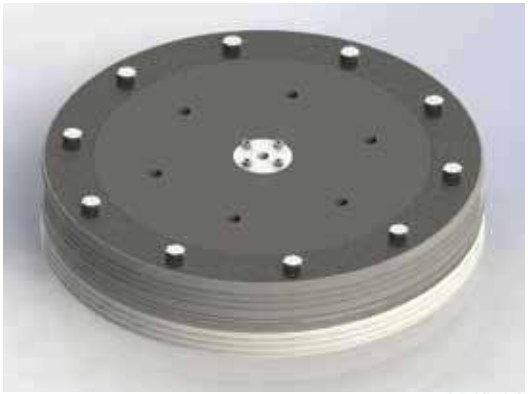
The frame mechanism integrates the piston mechanism, column tube mechanism,and column base mechanism. These components are assembled to the frame mechanism using structural members and fasteners.Our company's frame design minimizes weight while ensuring strength, thus reducing installation site requirements.

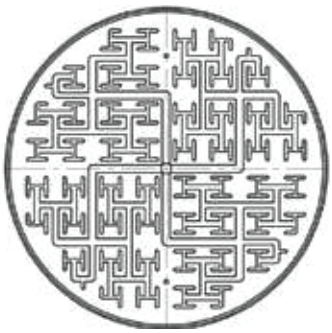
3.3.2 Column tube mechanism

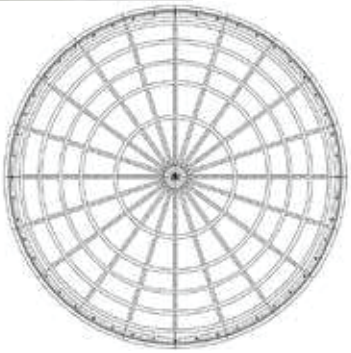
The column tube is the component that holds the packing material for sample separation. Due to its impact on the material,stringent requirements are placed on the smoothness and roundness of the inner wall of the column tube.Furthermore,since the column tube must withstand pressures up to 10 MPa,high structural requirements are also imposed. All of our column tubes are manufactured using a one-piece molding process,eliminating material changes, pinholes, and cracks caused by high-temperature welding, which can affect quality.

3.3.3 Piston mechanism

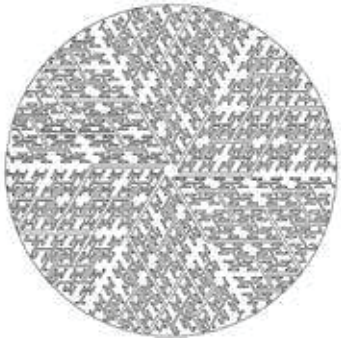
The piston mechanism is the most technically demanding component of the entire product. It primarily serves to distribute and seal the sample. Common distribution methods include H-tree, fan-shaped, and maze-shaped, and the selection is based on the customer's specific needs.

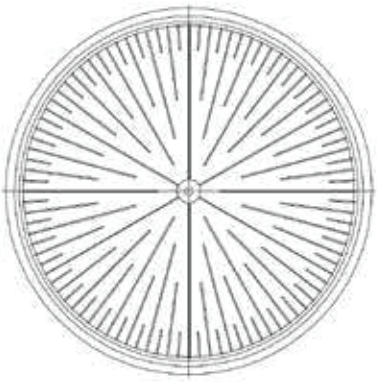






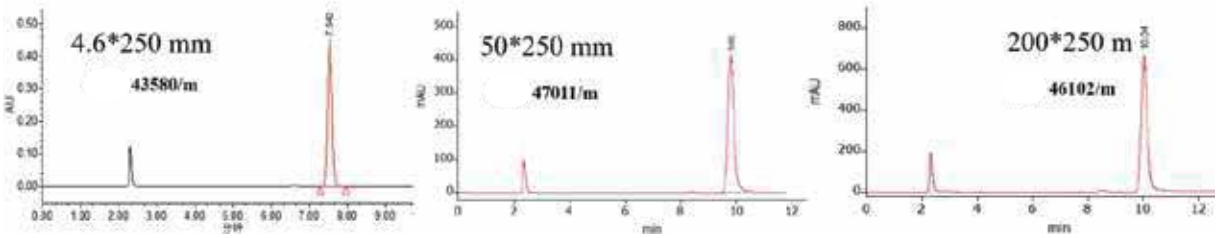
H-tree allocation fan allocation

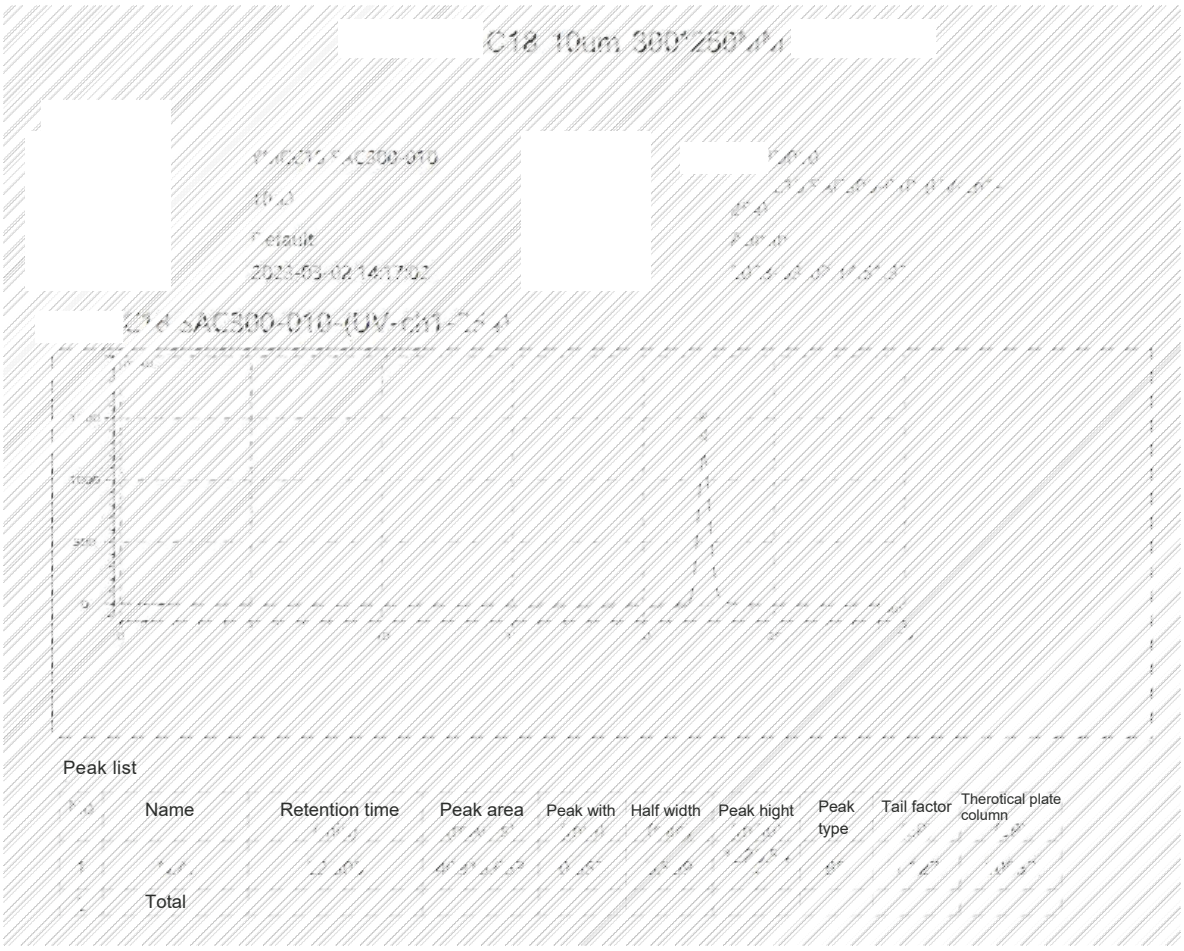




Other Allocation:

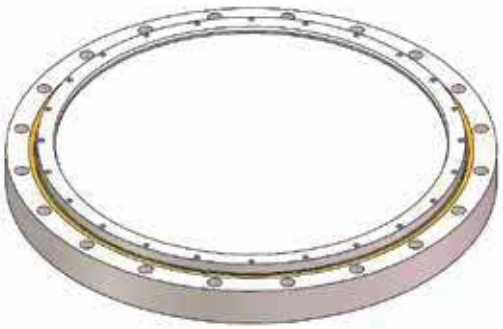
Practical verification has shown that method essentially achieves equivalent amplification of chromatographic column performance.It maintains a tailing factor of less than 1.2 on columns of varying specifications, with a theoretical plate count of ≥40,000/m (10μm packing). This effectively improves column performance.





3.3.4 Column base mechanism

The column base is a critical component for the proper functioning of the entire chromatography column. It must withstand the immense pressure from the hydraulic cylinder to prevent deformation,while also ensuring a tight seal to prevent leakage.Our column base seal utilizes a specially designed structure and sealing ring to ensure optimal performance. Furthermore, a forced collection system with the same structure as the piston is employed to ensure product yield and purity.



3.3.5 Hydraulic system:

1.Imported gas and oil circuit components are used to improve the sealing performance of the entire system, ensuring no leakage,high reliability,and extending the service life of the product.

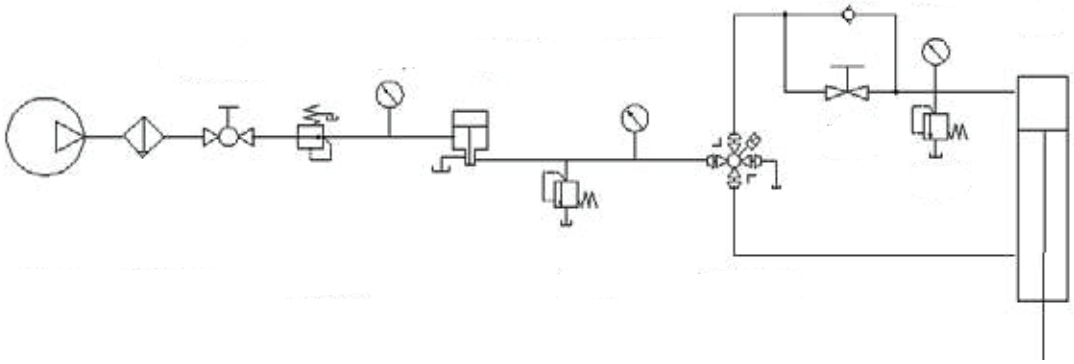
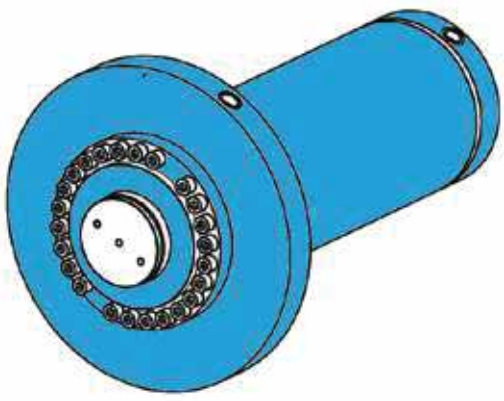


Figure 1-18 Hydraulic system flow chart

2) Hydraulic cylinder

The hydraulic cylinder is the most important actuator in the hydraulic system.It converts hydraulic energy into mechanical energy to achieve linear reciprocating motion. The hydraulic cylinder has a simple structure, flexible configuration, is easy to design and prepare, easy to use and maintain, and is widely used.

The main parameters are as follows:

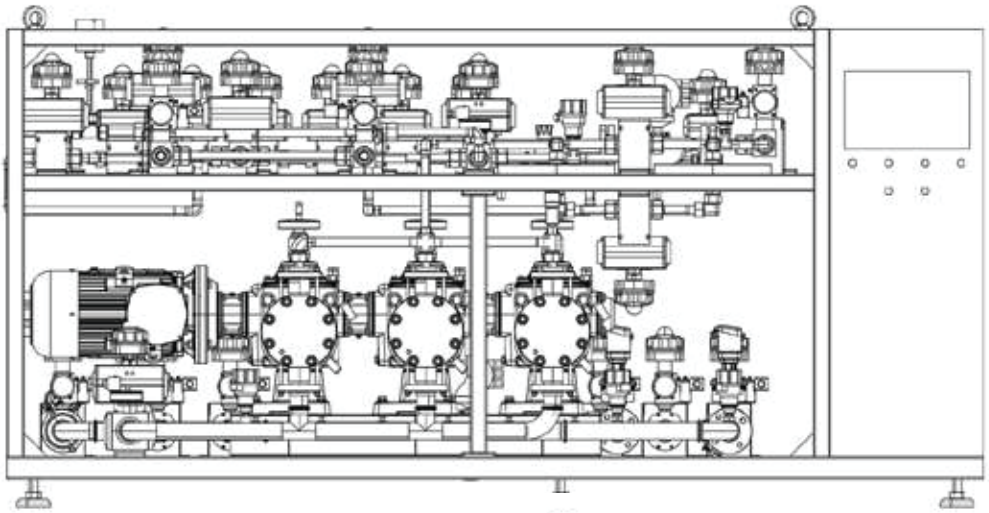


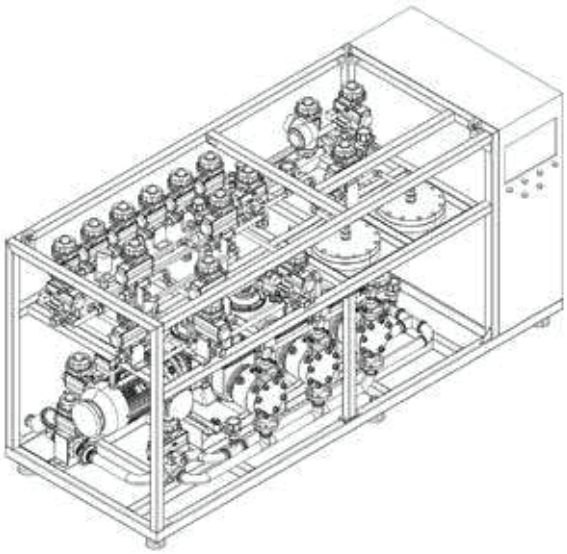
DAC wearing parts and spare parts list

NO.	Name and specifications	quantity
1	Piston sieve plate	2
2	Piston sieve plate seal	2
3	High-pressure sealing ring	2
4	Piston lower sealing ring	1
5	Piston upper sealing ring	1
6	Column bottom sieve plate	2
7	Column bottom sealing ring	2

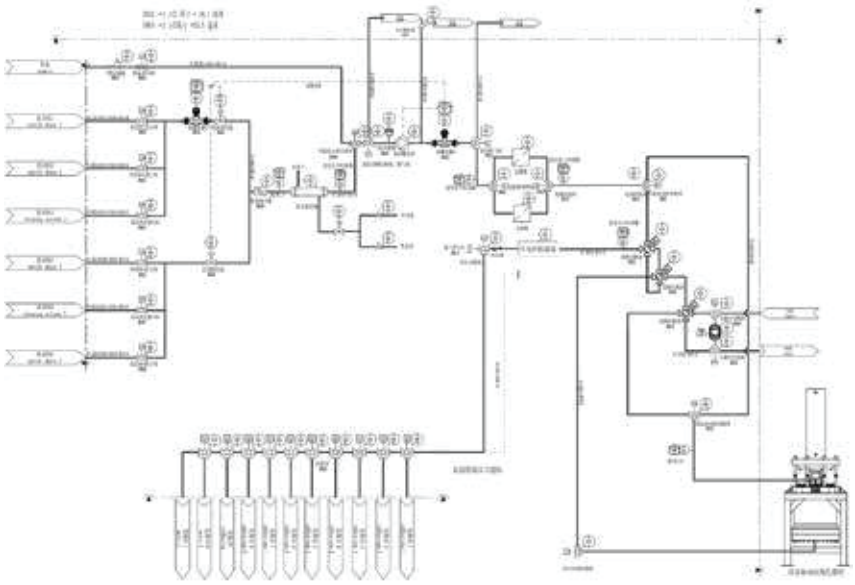
3.4 Infusion System

The solvent delivery system includes a solvent delivery pump, delivery pipelines, flow direction switching valves, and pressure monitoring equipment. The control system consists of an electrical control cabinet, which includes the motor inverter that drives the infusion pump, and a programmable logic controller (PLC). The system meets explosion-proof and cleanroom requirements, achieving an explosion-proof rating.





3.4.1 Infusion system flow chart



3.4.2 Infusion system configuration table

DAC Infusion System Configuration Table

No.	Models and specifications	Technical Parameters	quantity
1	Control software	Strictly follow URS requirements or partially exceed URS requirements, deeply customized	1
2	Sample inlet valve	Diameter: DN65 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: TC chuck interface Explosion-proof grade: ExmbIICT4	1
3	Sample line filter	Diameter: DN65 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: TC chuck interface Filter accuracy: 10um	1
4	Mobile phase inletvalve	Diameter: DN65 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: TC chuck interface	6
5	Inlet check valve	Diameter: DN65 Opening pressure: 1psi Pressure resistance: ≥118bar Working temperature: ≤93°C Material: 3 16 L, PTFE and inert wear-resistant material	2

6	Proportional control valve	Gradient mode: low pressure gradient. Flow range: 10-40L/min Gradient range: 5-95% Gradient accuracy: ≤±1%	2
7	Mass flow meter	Temperature range: -20～+200℃ Pressure: ≤10MPa Explosion-proof standard: Atex Ⅱ C T6 Measuring error: Measuring range: 0~6500kg/h Accuracy: ±0.15%	2
8	mixer	Type: Static Mixer Sanitary design, removable for cleaning	1
9	Low pressure transmitter	Installation position: before the pump, after thecolumn Pressure range: 0-1MPa Measurement error: ±0.15% Explosion-proof standard: Atex IIC T6	2
10	Bubble sensor	Installation location: Main pipe before pump Hygienic standards Explosion-proof standard: Atex IIC T6	1
11	High-pressure pressure transmitter	Installation position: 1 before and after the filter Pressure range: -1-10MPa Measurement error: ±0.15% Explosion-proof standard: Atex IIC T6	2
12 13	Safety relief valve Solvent delivery pump	Installation position: behind the pump Relief pressure: 10MPa Pressure relief accuracy: ±1bar Wetted material: 316L+PTFE Drain port: connected to waste liquid tank Type: 3 pump head metering diaphragm pump Safety protection: electronic diaphragm tear alarm, mechanical protection valve Flow rate range: ≤ 2 000L/h Working temperature: ≥60°C Flow accuracy (5%-95%): ≤1.5% Wetted material: 316L, PTFE Maximum working pressure: 10 MPa	1
14	Sample mobile phase switching valve before the pump	Type:Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	
15	CIRP switch and exhaust valve before pump	Type:Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN16 Working temperature: ≥65°C	

		Wetted material: 316L+PTFE Connection method: welding ferrule joint Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	
17	Filter switching valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN80 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	2
18	Inline filter	Filter diameter: ≥300 mm Screen plate aperture: 2um (imported screen plate) Connection method: bolt connection Sealing ring: O-ring (FEP+SI)), one for spare and one for use	2
19	Pump exhaust valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN80 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	1
20	Flow path switching four-way valve	Type: Two-position four-way pneumatic ball valve Diameter: DN32 Withstand voltage: PN80 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	2 1
21	Post-pump sample mobile phase switching valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN80 Working temperature: ≥65□ Wetted material: 316L+PTFE Connection method: welding ferrule joint	2 1
22	quantitative ring	Pressure resistance: 10MPa Material: 316L Volume: 300ml Connection method: welding ferrule joint	
23	Sample loop switching valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN80 Wetted material: 316L+PTFE Connection method: welding ferrule joint	
24	detector	Type: Fiber optic UV detector Flow cell: Large diameter fiber optic flow cell Wavelength: dual channel; wavelength adjustable,	

		wavelength range: 190nm ~ 400nm (deuterium lamp) Wavelength accuracy: ±2 nm Wavelength repeatability: 0.2nmnm Baseline drift: 4×10 -4 AU, 254nm Range: ≥ 3 AU	
25	thermometer		2
26	Post-column CIRP switch, exhaust valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	
27	Collection valve	Type: Two-position three-way pneumatic T-type ball valve Diameter: DN32 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: one end is welded with a ferrule connector, the other end is TC chuck interface	1
28	Blow and sweep	Type: Nitrogen interface Installation location: Installed on the collecting valve main pipe to collect the residual components in the pipeline into the collection tank	10
29	Purge valve	Type: Two-position three-way pneumatic L-type ball valve Diameter: DN32 Withstand voltage: PN16 Working temperature: ≥65°C Wetted material: 316L+PTFE Connection method: welding ferrule joint	1
30	One-way valve	Diameter: DN32 Opening pressure: 1psi Pressure resistance: ≥118bar Working temperature: ≤93°C Material:3 16 L,PTFE and inert wear-resistant material	1
31	control system	Type:Positive pressure explosion-proof control cabinet PLC: Siemens S7-1200 Other components: Schneider or equivalent brand Safety protection: emergency stop button, sound and light alarm, grounding interface, overpressure alarm, ultra-high pressure shutdown Industrial computer: 1TB mechanical hard drive, genuine Windows 10 Remote control computer: brand computer	1
32	Heat exchange system	1 heat exchanger, 1 regulating valve, switch valve, pipeline, etc.	1 1 set
33	Pipes and joints	316L, flange, welding ferrule connection	1batch
34	frame	SUS304, brushed surface, no sharp corners	1

35	Logo	Material flow direction of process pipelines, instrument location numbers	1
All parts in contact with materials are made of 316L, PTFE, PEEK, FEP, and material certificates are included.			

3.4.3.1 Infusion Pump

ProMinent is a world-renowned expert in precision fluid metering and water treatment equipment and technical solutions. Headquartered in Heidelberg,Germany,ProMinent has over 60 years of development and now has more than 50 subsidiaries and 11 production sites worldwide, with operations in over 100 countries and regions. Leveraging decades of experience in various industries, ProMinent's fluid metering,measurement and control technology, water treatment and disinfection, and digital products and solutions serve over 80 industries,including water treatment,oil and gas,chemicals, pharmaceuticals, and food and beverages.

3.4.3.2 Sample detection system

This system uses a fiber optic detector, which is installed in a positive pressure explosion-proof cabinet and the flow cell is external to meet the explosion-proof grade requirements.

3.4.3.3 Mass flow meter

E+H mass flowmeters are complete measuring instruments that automatically perform online, continuous flow measurement and compensation calculations, eliminating the need for frequent operator intervention.They are fully adaptable to the climatic and environmental conditions along the pipeline as designed. Aside from periodic inspections, instrument calibration and routine maintenance,mass flowmeters are maintenance-free.
The transmitter has two options: integrated and split types according to site needs.
This solution adopts split installation, and the head installation is flexible,which is convenient for users to observe. When the operation stops, the PLC outputs a status contact to the mass flow meter, forcing it to return to zero and not count randomly.
When the mass flow meter is working, it continuously detects the liquid flow in the pipeline, and at the same time detects whether there is a gas-liquid two-phase situation, and inputs its status signal to the PLC.
Main performance parameters
Measurement accuracy: +/-0.1%,
Repeatability: +/-0.05%
Measurement functions: instantaneous flow, cumulative flow, mass flow, volume flow, temperature, density
and self-diagnosis
Pressure rating: 1" 300lbs
Protection level: IP67 (equivalent to NEMA 4X and 6 IEC 529/EN 60529
Explosion-proof certification: ATEX II 1/2GD EEx d IMaterial: Measuring tube: 316L, Flange: SS316L,
Transmitter housing: Aluminum
Medium temperature: -40 ～ +140℃
Ambient temperature: -40～+60℃
Power supply: 220VAC / 50Hz
Electrical connection: NPT ½"
Language: English

Output signal: 4~20mA HART+frequency+relay+status input
Communication protocol: HART
Electrical isolation: All outputs and inputs are isolated from the power supply
Operating frequency: 300~1100Hz

3.4.3.4 Pressure transmitter

In order to prevent the pressure on the system from deviating from the design conditions and causing abnormal system operation,pressure transmitters are installed in key

locations to monitor pressure changes
and ensure the safety of system operation.
Main technical indicators
Measuring range: 0-10MPag
Connection type: Threaded FNPT ½”
Accuracy: 0.075% (PAC certification required)
Power supply: 24VDC, 4-20mA loop powered

3.4.3.5 Pneumatic switching ball valve

Main technical indicators
Nominal diameter: DN65 (infusion pump inlet)
Nominal diameter: DN32 (infusion pump outlet)
Nominal pressure: 16bar/10MPa
Valve body material: 316L
Valve seat material: R.PTFE
Valve core and stem material: 316SSActuator: Air-open single-acting cylinder
Filter pressure reducing valve: with
Connection type: ferrule connection
Solenoid valve: ASCO 24VDC
Explosion-proof grade: dIIBT6
Protection level: IP67

3.4.3.6 Proportional control valve

Main technical indicators
Nominal diameter: DN65 (infusion pump inlet)
Nominal diameter: DN32 (infusion pump outlet)
Nominal pressure: 16bar/10MPa
Valve body material: 316L
Valve seat material: R.PTFE
Valve core and stem material: 316SSActuator: Air-open single-acting cylinder
Filter pressure reducing valve: with
Connection type: ferrule connection
Solenoid valve: ASCO 24VDC
Explosion-proof grade: dIIBT6
Protection level: IP67

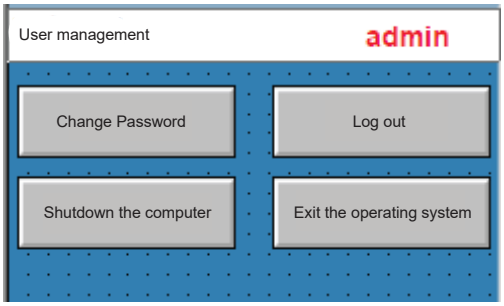
Valve body material: 316L
Diameter range: DN15-DN250
Pressure rating: PN40-PN160; ANSI150-900
Temperature range: -200-530°C
Control characteristics: linear, medium linear, equal percentage
Actuator: pneumatic, electric, hydraulic, manual, self-powered

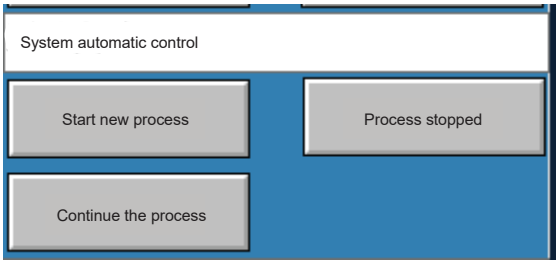
List of wearing parts and consumables of infusion system

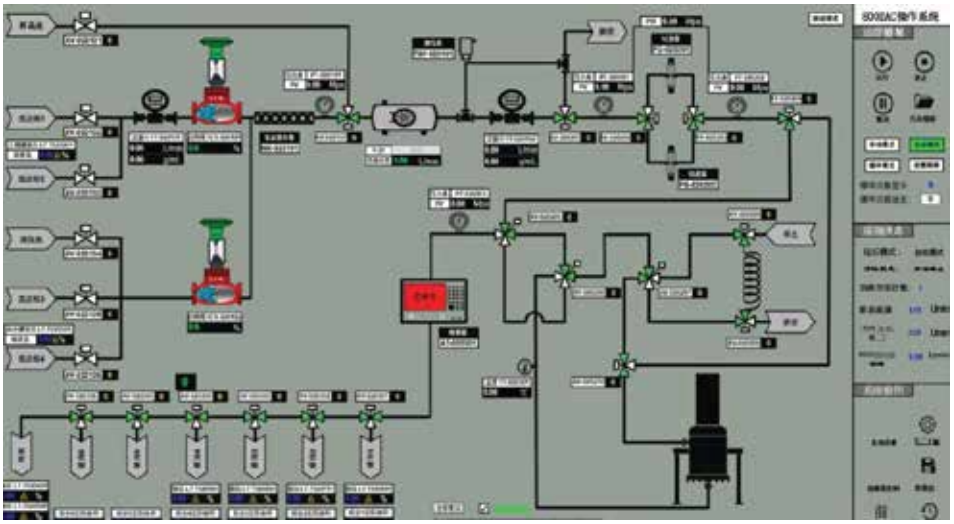
1	Metering pump check valve	6
2	Metering pump diaphragm	6
3	Metering pump hydraulic oil	N/A
4	Metering pump lubricant	N/A
5	In-line filter frits	2
6	Inline filter seal	2
7	Detector deuterium lamp	1

3.5 Online control and monitoring system

The software system, centered around liquid phase control software, was developed specifically for the needs of industrial chromatography. Compliant with FDA Part II requirements,it provides audit tracking and user-level review capabilities.The software utilizes a graphical control interface, providing a clear overview of system piping. The interface is simple and practical, and can be deeply customized to meet specific user needs.







Control software interface

Technical parameters:

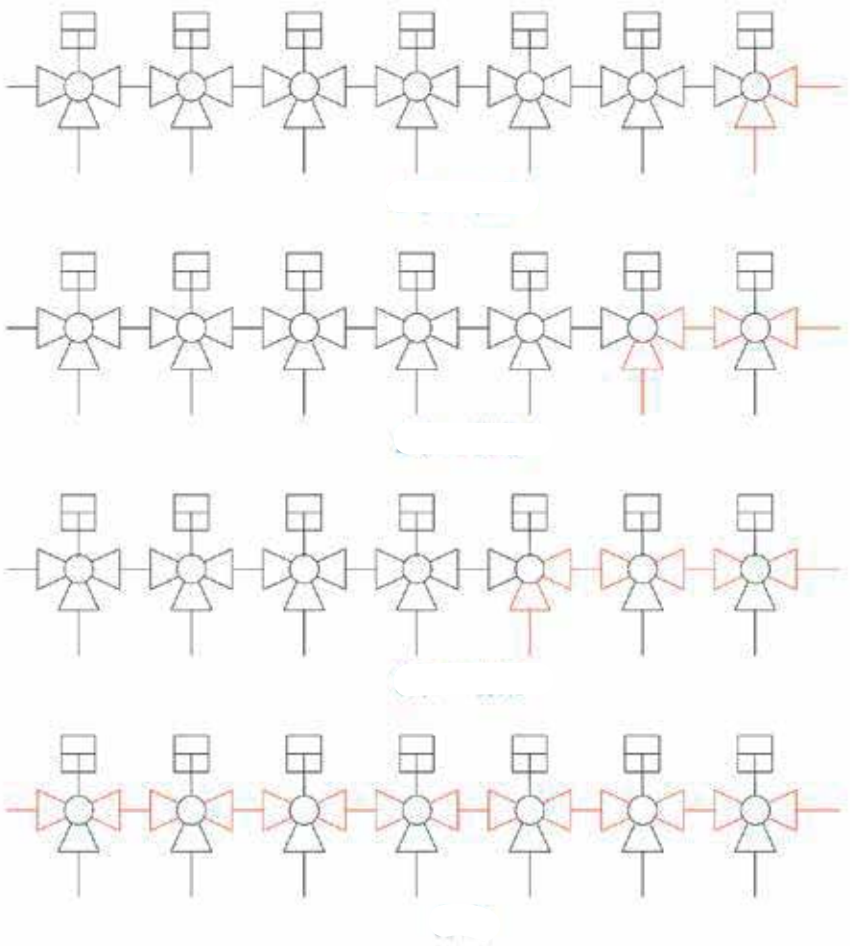
Local Control	Industrial Computer	Windows 10
Chromatography workstation	Software compliance requirements	User permissions, electronic signatures,audit trails,and traceability of all data are ensured; data is automatically recorded and stored; data is authentic and reliable, and original data cannot be altered. Data from the entire production process (such as chromatograms) must be recorded. All production data must be backed up and restored,either by storing it on a USB flash drive or other removable storage device, or by implementing measures to ensure effective data recovery in the event of a computer anomaly.
	Online monitoring, alarm and shutdown	The system can monitor various parameters of the entire purification system online during operation,such as time,flow rate,mobile phase ratio during elution, sample peak conditions, etc., and can set important parameters. If certain parameters (such as pressure) exceed the set range, the system can make relevant responses (alarm or automatic shutdown).
	Calculation function	Calculate the performance of the chromatographic column, such as the theoretical plate number, separation degree, symmetry coefficient and other data of the chromatographic peak.

Local Control	Industrial Computer	Windows 10
	Operation interfaceand parameter settings	The system includes a user-friendly interface (P&ID) and controls the entire purification system from the P&ID's component buttons. The system can perform operations including, but not limited to, setting parameters to ensure system operation, such as upper pressure limit, maximum flow rate, and detector wavelength. It can also operate the system to balance, inject samples, elute samples, collect fractions, and perform backflushing and bypassing of the column system.
	Traceability	The entire system has detailed historical records, archiving, inspection and tracking from user login to purification completion. If any problem occurs, it can be traced back to the entire process.

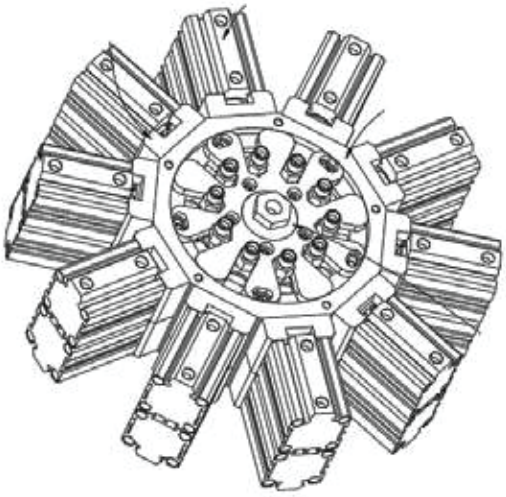
3.6 Collection System

3.6.1 Conventional collection valve group solution

The collection system consists of 11 interconnected three-way valves. Compared to conventional two-way valves, these valves double as three-way valves, significantly reducing system dead volume and improving product yield and purity. Collection can be performed by time, peak height, or a combination of time and peak height.

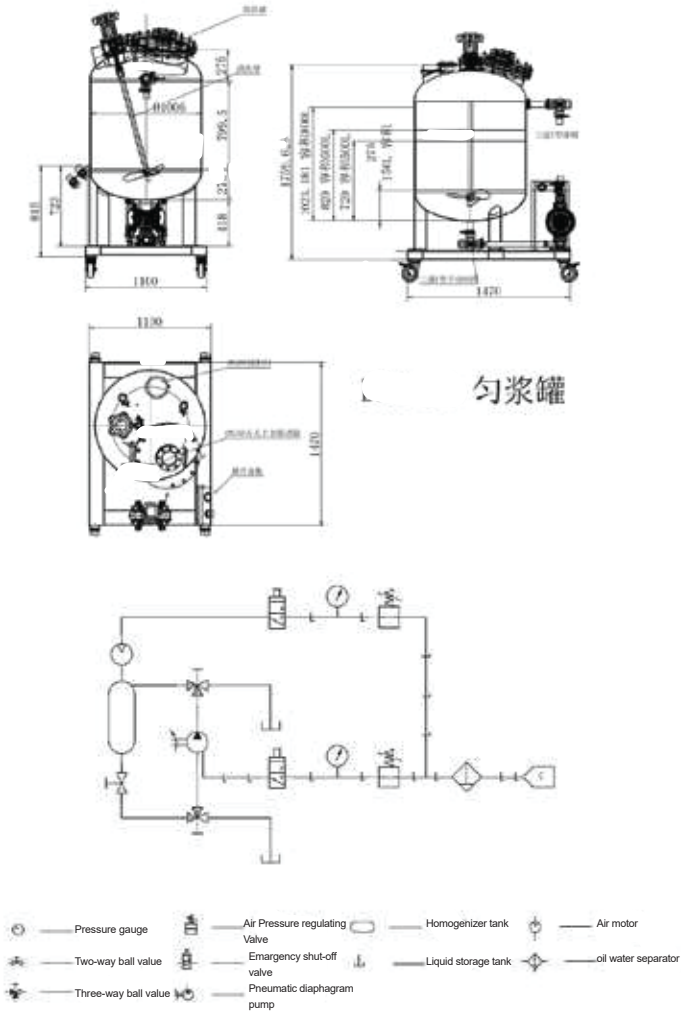


3.6.2 Patented Collection Valve Solution



This converging multi-channel valve, through the arrangement of the frame valve section, provides a smooth inlet and outlet path for liquids. The annular valve section facilitates optimal diversion conditions,dispersing or converging the liquid from the frame valve section circumferentially. Furthermore, the converging design significantly reduces dead volume in the pipeline, improving product purity.

3.7 Homogenization system



Schematic diagram of homogenization system

3.7.1 Purpose of the homogenization system

This equipment is used for stirring and conveying industrial dynamic axial compression preparation columhomogenate.

3.7.2 Design parameters:

(1) The volume of the homogenate is designed to be 1.2 times the maximum volume of the chromatographicolumn to ensure that the homogenate does not overflow during stirring.

(2) The delivery speed is designed to deliver the entire homogenate within 2 minutes.

(3) The slurry delivery, mixing and circulation of the mixed liquid are all achieved by pneumatic actuators.

(4) The homogenization mechanism is specially designed to ensure the uniformity of the homogenization.

(5) All operations except manual addition of fillers are automatic.

(6) The homogenization tank is sealed as a whole.

(7) The homogenization tank shall include at least the following interfaces:observation window,filler feeding port,manhole,stirring mechanism interface,homogenization liquid injection port, and mixed liquid circulation port.

(8) All materials that come into contact with the homogenate and mixed liquid are 316L, PTFE and other materials that meet cGMP requirements.

(9) The pipe connecting to the chromatographic column is a hose that meets the requirements. The whole body is movable.

3.7.3 Workflow

(1) Use a pneumatic diaphragm pump to suck the homogenate into the homogenate tank.

(2) Add filler from the filler feeding port (a special feeding device can be installed if special requirements are met).

(3) Start the stirring mechanism and observe the stirring situation through the observation window. During the stirring process, the pneumatic diaphragm pump can be started for circulation so that the filler at the bottom of the homogenization tank can also be stirred evenly.

(4) After observing that the filler is evenly stirred through the observation window,use an air-operated diaphragm pump to transport the mixed liquid into the chromatographic column.

(5) Start the pneumatic diaphragm pump to suck in a certain amount of homogenate to clean the homogenate tank. Start with a circulating cleansing process and then discharge the cleaning liquid directly into the collection container.

3.7.3 Technical parameters of homogenization tank

category	unit	parameter
Maximum working pressure of feed pump	bar	5.6
Maximum flow of feed pump	lpm	350
Self-priming lift of feed pump	mwc	3.3
The feed pump can pass the maximum particle diameter	mm	2
Wetted parts material		316L，PTFE
Maximum power of electric motor	hp	3.6
Maximum free speed of electric motor	rpm	3900
Electric motor with reducer ratio		1:100
Homogenizer tank capacity	L	400
Homogenizer tank material		316L，316L，Ra≤0.4
Opening		Manhole, CIP, 3 spare holes
observe		sight glass

***The equipment needs to use dry and pure compressed air**

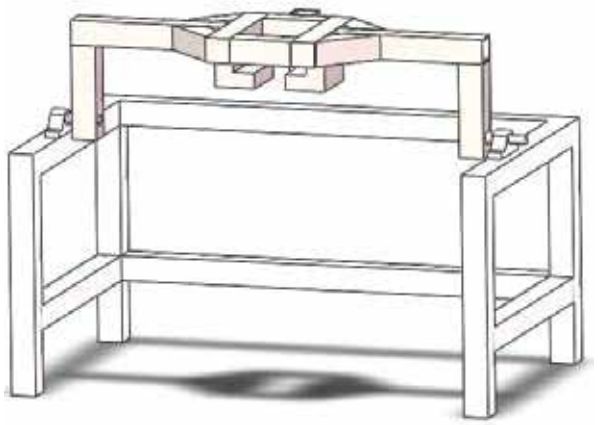
3.8 Assistance System

The auxiliary system includes a special valve for column packing,a tool kit and auxiliary devices for disassembling and installing the chromatographic column.

The column packing valve is only used when filling the chromatographic column. Its structure is an L-type two-position three-way manual ball valve.

3.8.1 Piston and column bottom flange flip mechanism

The turning mechanism is specially equipped for piston machines and column bottom flanges.It is an auxiliary device used during maintenance and cleaning.The piston turning mechanism mainly consists of two parts: the bracket and the turning mechanism. The bracket is the overall support. The turning mechanism realizes the turning function.

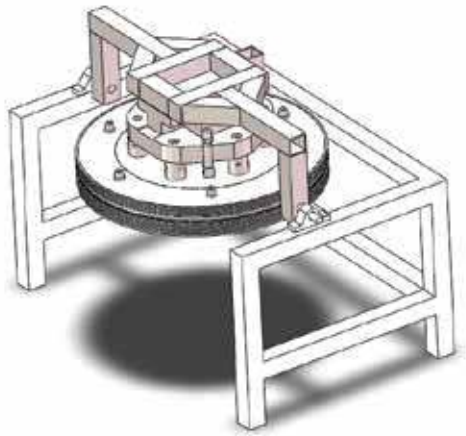


Features:

In the design of the piston's tilting mechanism, the center of gravity of the piston structure and the entire tilting body is positioned as close as possible to the tilting axis (±5mm) to reduce the tilting torque.A dedicated tilting component is also included to reduce operating torque and provide self-locking properties.This component ensures that the piston self-locks at any tilting angle, ensuring operational safety.

Instructions

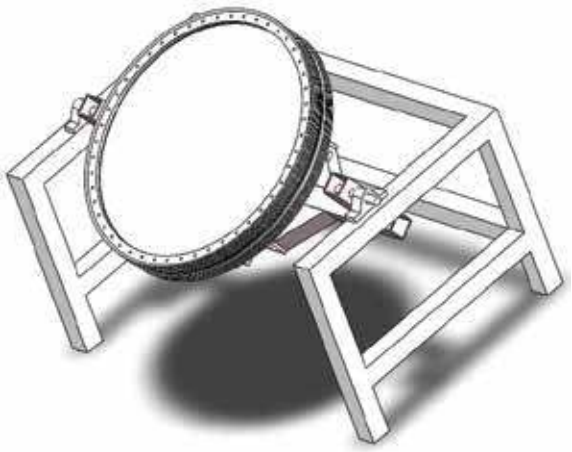
1) Piston fixed



Align the piston connection block with the piston positioning block and insert it until the piston connection block is close to the positioning end surface of the flip bracket. Secure the piston.

Piston flip

Turn the handwheel to flip the piston.



Working process of piston flipping

The tilt mechanism has a built-in locking device, and the piston can be hovered at any position. However, it is usually recommended to operate the piston at 120° and 180°.

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Chromatography will provide excellent technical services, including: user technical training (installation training, installation guidance, on-site commissioning, operation and maintenance training), troubleshooting, commissioning and repair, etc., but not limited to the above.

Chromatography provides relevant technical services to the buyer or end user in strict accordance with the technical service terms signed with the buyer.

4.1 User technical training

Time: The specific time will be discussed at the first project coordination meeting

Location: Seller's location

Training target: 2-5 user engineers

Training days: 1-3 days

The purpose of the training is to enable the trainees to master the functions of the instruments, equipment and software systems used, the structure and principles of the software and hardware, and the configuration of the system; to master the hardware installation, debugging, operation,maintenance and repair of the system;to master the installation,operation,debugging and maintenance of computer system software,control system software, and instrument debugging software; to enable the trainees to independently complete the installation, debugging, commissioning, development,operation management and maintenance of the automation system.

4.2 Technical information and certification

Our company will provide complete technical information. For imported equipment, we will provide English technical information, and for domestic equipment,system internal wiring drawings, equipment installation dimension drawings, etc.

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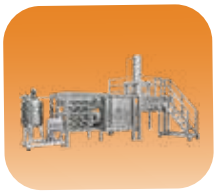


Production HPLC

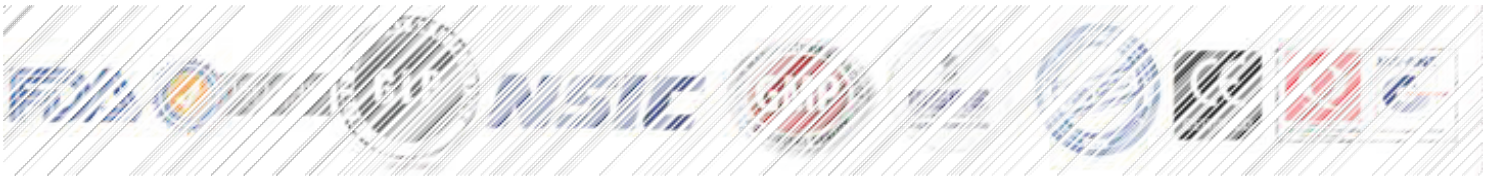
HPLC

Column

DLS

Water purification system

Regulatory compliances



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