



Precision Benchtop Chromatography Unit

SEPARATION

PRODUCT SUMMARY

The Precision Benchtop Chromatography Unit executes chromatography operations in manual, semi-automated, or fully automated modes to optimize your chromatography needs. Its space-saving design suits laboratories with limited space, and customizable hardware options cater to specific process needs. The unit integrates with existing setups through Rockwell infrastructure, facilitating seamless data exchange. Real-time monitoring, data logging, and advanced control ensure precision. This unit elevates process control, efficiency, and reliability, making it a compact, configurable, and capable solution for dependable chromatography separation.

APPLICATIONS:

Our Chromatography Unit is meticulously designed to excel in various bioprocessing applications, offering

efficient and reliable filtration solution. Its adaptability and advanced features facilitate seamless integration into diverse processes, ensuring optimal performance and consistently high-quality outcomes. The chromatography unit's versatility plays a pivotal role in various downstream stages. Applications where our unit excels:

- Protein Purification & Isolation
- Biomolecule Separation
- Analytical & Preparative Chromatography
- Process Development
- Small Molecule Separation
- Sample Analysis and Fractionation

CUSTOMIZATION & FLOW FLEXIBILITY:

The chromatography unit is designed for adaptability, with the option to customize it to be compatible with the chromatography column of your choice, offering flexibility for various separation techniques. The unit also features bi-directional flow capabilities, allowing liquid to move

through the column in both reverse and forward flow directions. This flexibility enhances efficiency in processes such as counter-current chromatography and optimizing resin packing and washing.

BENEFITS OF THE AES PRECISION CHROMATOGRAPHY UNIT:

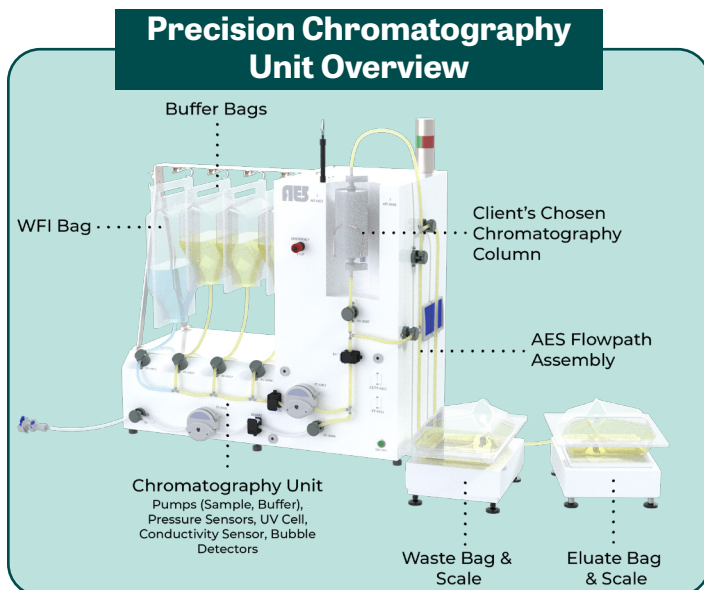
- The unit can be customized to work with any chromatography column, offering flexibility to meet separation needs and ensuring optimal performance for various processes.
- The system allows liquid to flow upward and downward through the column, enhancing efficiency in techniques like resin packing and counter-current chromatography.
- With integrated sensors for conductivity, pressure, and UV monitoring, the unit provides precise, real-time control, while its automation ensures seamless, efficient operation.
- The compact design makes it ideal for labs with limited space, and seamless integration with existing infrastructure reduces installation time and costs
- The bubble detection system prevents air contamination, ensuring column protection and maximizing product yield by maintaining the integrity of the separation process.

AUTOMATED PROCESS MONITORING & REMOTE CONTROL:

Users can configure alerts and set points, tailoring them to their application requirements. They can monitor trend reports for these crucial process values, gaining valuable insights into their system performance. Additionally, users are equipped to create, edit, and save methods, enabling them to optimize purification protocols according to their unique needs. This comprehensive suite of features empowers operators to effectively manage their operations, providing them with the tools needed to swiftly identify deviations from the defined purification parameters.

DESIGNED FOR A REGULATED ENVIRONMENT:

This chromatography unit can be designed to meet a regulated environment's rigorous demands and standards if required. In addition, the chromatography unit is GMP



compliant and can be incorporated to meet 21 CFR Part 11 compliance regulations.

PURIFICATION WORKFLOW:

Our chromatography unit seamlessly integrates into purification protocols, working with our Tangential Flow Filtration (TFF) unit to deliver comprehensive and efficient bioprocessing workflows. The Chromatography Unit is designed to be compatible with various unit operations, including downstream filtration processes such as separation. Our team of application specialists is available to provide valuable expertise and guidance on process design, ensuring optimal integration and efficiency throughout your bioprocessing workflow. Our chromatography and TFF units offer a powerful solution for your separation needs, enabling streamlined and robust processes to achieve high-quality results.

SYSTEM OVERVIEW

This Benchtop Chromatography Unit houses all essential hardware and instrumentation within a compact, benchtop enclosure. The system incorporates two benchtop scales, inlet pumps, pressure sensors, UV sensor, conductivity, temperature, and bubble detection, ensuring accurate and reliable process control throughout the chromatography steps. Additionally, this unit offers seamless integration options with existing Rockwell infrastructure, allowing users to benefit from its features while leveraging their current bioprocessing setup.

UV MONITORING:

The chromatography unit incorporates a single-use UV flow cell with a cutting-edge UV photometer. UV analysis is critical to the system, enabling real-time protein elution, peak identification, and purity assessment monitoring. The availability of real-time UV data empowers users to optimize gradient conditions, precisely identify target fractions, and achieve exceptional separation results with unmatched purity and quality.

LIQUID MANAGEMENT:

Our chromatography unit is designed for precise and efficient fluid handling, featuring two inlet pumps with adjustable speeds for optimal flow control throughout the separation process. Each pump is powered by bi-directional stepper motors, allowing seamless and fine-tuned adjustments tailored to the specific needs of chromatographic operations. The unit's peristaltic pumping technology ensures reliable fluid transfer and control, contributing to superior chromatographic performance.

Buffer Pump:

The Buffer Pump is responsible for maintaining consistent flow rates during critical chromatographic steps. With adjustable speed settings, this peristaltic pump delivers precise flow control, ensuring optimal interaction between buffer solutions and the chromatography column.

Sample Pump:

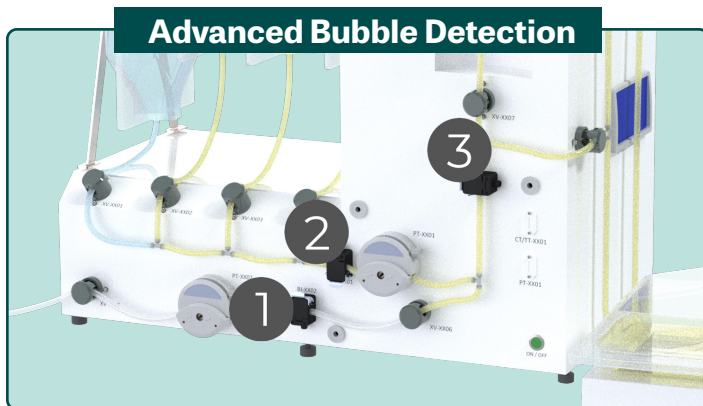
The Sample Pump guarantees accurate sample introduction with reliable control over flow rates. This pump's fine-tuning capabilities allow consistent processing of samples, ensuring precision and efficiency at every step of your chromatography workflow.

PRESSURE SENSOR:

A state-of-the-art single-use pressure sensor is seamlessly integrated into this chromatography unit, enabling real-time monitoring of the chromatography process pressure. This advanced feature empowers users to detect irregularities and deviations in the pressure profile, ensuring the highest quality and reliability throughout the chromatography process.

BUBBLE DETECTION:

Our chromatography unit incorporates an advanced, non-invasive clamp-on bubble detection system, enhancing your chromatography processes. This innovative feature offers many benefits, guaranteeing unmatched safety and efficiency throughout your chromatography endeavors. The continuous monitoring for air bubbles within the chromatography process assures seamless separations, preserving the integrity of columns and valuable samples. This level of process security is of utmost importance for delicate biomolecules, shielding them from disruptions that could compromise purity and yield. The real-time optimization of flow rates and conditions empowers you to elevate efficiency, minimize waste, and achieve elevated throughput.



1. Sample Bubble Detector Connection 2. Buffer Bubble Detector Connection 3. Post Pump Bubble Detector Connection

CONDUCTIVITY CONTROL:

Our chromatography unit features a state-of-the-art single-use conductivity sensor that allows precise real-time monitoring during the elution process. By enabling users to closely track conductivity, the system provides critical insights into the separation process, ensuring optimal conditions to maximize yield and purity. This advanced control contributes to unparalleled performance and reliability in your chromatography workflow.

TEMPERATURE MONITORING:

While the system does not control temperature, it is equipped with a temperature transmitter that provides real-time temperature data for process monitoring. This capability allows users to monitor and assess temperature conditions, ensuring that environmental factors are properly managed during chromatography operations.

FLOWPATH & CONSUMABLES:

Our chromatography unit ensures optimal separation performance by providing a complete range of consumables for efficient and sterile operations. From the flowpath assembly to various specialized bags, our consumables streamline setup and support reliable chromatography processes.

Flowpath Assembly:

The pre-assembled and sterilized flowpath assembly is designed to optimize fluid transfer and compatibility for various purification applications, including protein purification and fraction collection. The flowpath also includes the sample manifold and pre-sterilized sample bags for precise sample handling and collection, ensuring reliable transfer throughout the process. This setup supports seamless integration, ensuring optimal fluid flow and efficient operation.

Bags:

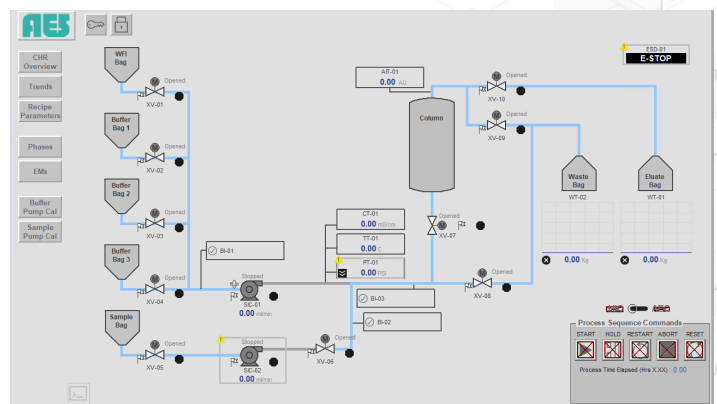
We offer a variety of sterilized, ready-to-use bags to support your chromatography process:

- WFI Bags: For reliable water-for-injection handling and storage.
- Buffer Bags: Designed for buffer exchange to maintain consistency in your purification process.
- Waste Bags: For secure collection of waste fractions during the process.

Together, these components streamline your workflow, providing a comprehensive, easy-to-use solution for your purification needs.

AUTOMATION & CONTROL SYSTEMS:

The Precision Chromatography Benchtop Unit's automation and control software offers flexible integration into your setup, supporting PC laptop control and Ethernet communication standards. The standard offering for the controller is Rockwell™, providing real-time data acquisition and enabling accurate process control. Convenient trend analysis further enhances the capabilities of this chromatography unit. With streamlined tech transfer, scale-up, and recipe sharing, this chromatography unit simplifies research and facilitates seamless automation across different stages of the product development process.



The featured overview screen exhibits sample numbers exclusively and is subject to variation based upon the client's operational process workflow.

DATA & COMMUNICATION:

The Precision Chromatography Benchtop Unit is an innovative piece of lab equipment that provides precise data and control functions. The user-friendly interface displays real-time and historical data and can meet the specific needs of each experiment. Additionally, the platform includes advanced features such as remote monitoring and control, data logging, and alarm notifications, allowing for efficient and reliable operation.

TECHNICAL SPECIFICATIONS

Enclosure Specifications	
Enclosure Footprint (H x W x D)	41.7 in x 41.3 in x 20.3 in
Power Requirements	120 - 230 VAC, 50/60 Hz, 1200 Watts
Equipment & Instrumentation Specifications	
Liquid Control	
Onboard Pumps	(2) pumps with Bi-Directional Stepper Motors
Pump Head Type	Peristaltic, Flip-Top Pump Heads
Pump Speed Range	0.2 - 200 RPM
Pump Capacity / Flow Capacity	340 mL/min
Max Tubing Size	L/S #25
Max Tubing Inside Diameter	4.8 mm (~3/16 in)
Process Analytics	
Inline Pressure Sensor	(1) Single-Use Pressure Sensor
Pressure Range	0 – 60 psi ± 0.15 psi
Overpressure Protection	Yes
Onboard UV Cell	(1) Single-Use Flow Cell with UV Photometer
UV Wavelength	260 nm
Conductivity Sensor	(1) Single-Use Conductivity Sensor with Conductivity & Temperature Transmitter
Conductivity Range	0 – 100 mS
Temperature Range	2 – 50 °C
Inline Bubble Detectors	(3) Clamp-on Bubble Detectors
Weight Measurement	
Eluate Scale	4 kg ± 0.01 Readability, Ethernet/IP
Waste Scale	15 kg ± 0.01 Readability, Ethernet/IP
Automation & Control Software	
Standard Offering	AES Library Rockwell™