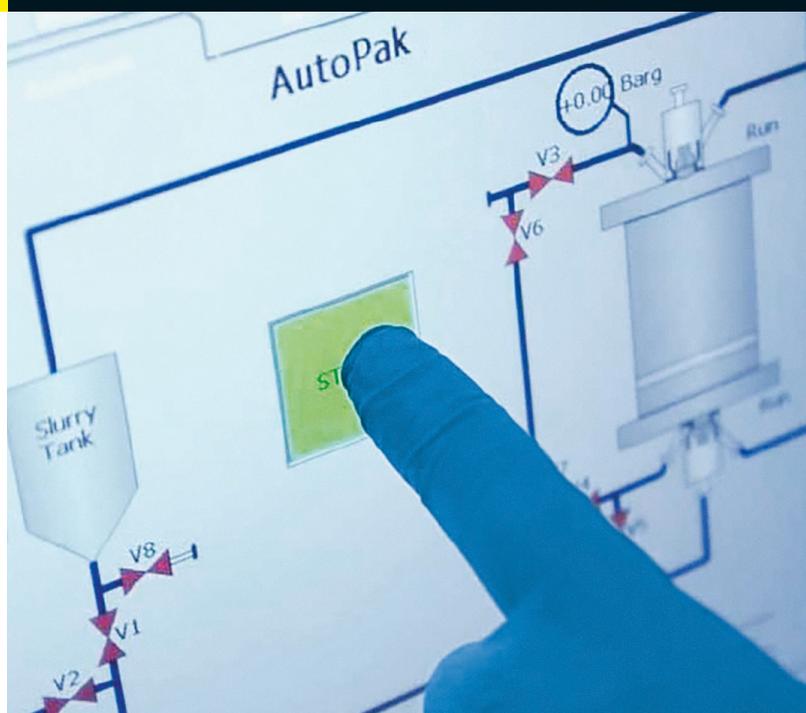


Resolute[®] AutoPak

Fully automated column packing, unpacking and clean-in-place (CIP) at the touch of a button

Benefits

- fully automated operations ensure reproducible and consistent column performance
- reduced equipment requirements, complete resin usage, and faster, simplified packing and unpacking lead to process efficiencies and savings
- lower demands on operators and elimination of human error reduce risk
- multiple, fully configurable packing methods to suit a wide range of resins



Product Information

Available with all Resolute Hydraulic columns, AutoPak is an integrated system which automates the operations required for chromatography column preparation prior to use.

With the risks of human error eliminated, minimal training requirements and fewer operators needed, cleanroom efficiency is increased and personnel are available for other tasks. By integrating all the packing functionality into the hydraulic power unit the need for a separate packing skid is eliminated.

With a set-up that simplifies traditional pump pack methods AutoPak provides a quicker, more predictable turnaround for packing operations. Additionally the ability to use all slurry in the tank means savings can be made in overall resin consumption.

Packing, Unpacking and CIP

The key operations, particularly packing, required for the pre-process preparation of a chromatography column are regarded as high risk events. These risks include human error, packing failure and absence of experienced operators. This can result in plant downtime, loss of product or sorbent as well as inefficient use of resources.

By adopting a fully automated approach AutoPak greatly simplifies operation, effectively eliminating operator error and reducing the burden on key operators. The automated sequences assure that reproducible, consistent operation is the norm.

The three key steps that are automated are described below.

Packing

- Operator is only required to push the start button and enter a slurry concentration for packing to begin – no further operator input required
- Packing sequence primes, fills and packs the column
- No excess slurry required; All of the slurry can be used to pack the column, minimizing resin carry-over and wastage

Unpacking

- Unpacking sequence initiated at the push of a button and continues until the column is unpacked
- Option to repeat a buffer-efficient rinse cycle for maximum media recovery
- Unpacking volumes equivalent to (and often better than) manual unpacking
- No additional equipment required

Clean-In-Place (CIP)

- CIP sequence ensures column, associated pipework and valve weirs are independently swept with cleaning liquid
- All waste liquids are exhausted through single exit point for easy monitoring of pH or conductivity
- No additional pump required

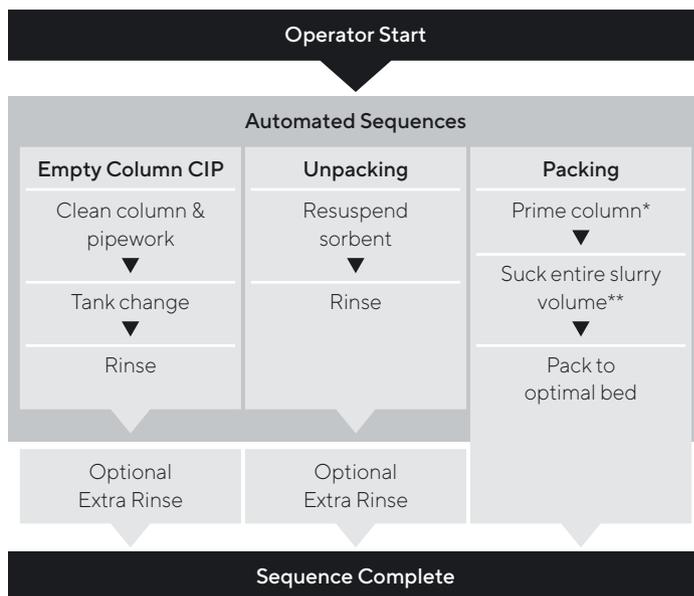


Figure 1: Packing | Unpacking | CIP Sequence Overview

* Dependent on packing method.

** Alternatively AutoPak can accurately control the slurry volume introduced into the column.

Hardware

The column is supplied with remote-actuated mobile phase and bypass valve blocks. An additional valve block, to control liquid flow from the buffer and slurry tanks is included.

Valves dedicated to air entry are provided to both the slurry tank inlet and bottom mobile phase valve blocks, assisting re-suspension of settled slurry and packed beds.

AutoPak has full control of valving, as well as adjuster movement and nozzle operation during automated sequences. The system additionally has a liquid sensor that allows AutoPak to monitor the column fill status.

Using the local touch screen interface, the valves can be controlled when the Hydraulic Power Unit (HPU) is not connected, minimizing issues related to working at height.

Safety

To ensure an operator is always in attendance, the continuation of any sequence can be controlled through the use of an optional safety switch.

Software and Process Control

AutoPak software resides within an industry-standard PLC control, effected through a high-resolution touch screen.

The user interface integrates with the familiar hydraulic software, allowing initiation and commissioning of all sequences at appropriate levels of access control.

The software also permits full manual control of the column, while the on-screen schematic provides a real-time indication of the system status during all operations.

Configuration of Fully-Automated Sequences

AutoPak systems ship with a comprehensive range of default settings. These form a baseline for easy one-time optimization, ensuring customer-specific process and performance requirements are met.

All sequences are fully-configurable to meet all column geometries, plant-specific conditions and types of resin.

Compatibility

Because AutoPak does not compromise the proven Resolute functionality any column with AutoPak can utilize all legacy hydraulic and pump pack methods.

Field Support

Full packing assistance and training are available from a global network of specialists.

Availability

The AutoPak software is available on all new Resolute Hydraulic columns which range in size from 300–2000 mm internal diameter, and as a retro-fit to installed Resolute Hydraulic columns on a case-by-case basis.

Please contact a local sales representative to arrange a demonstration or for additional information.

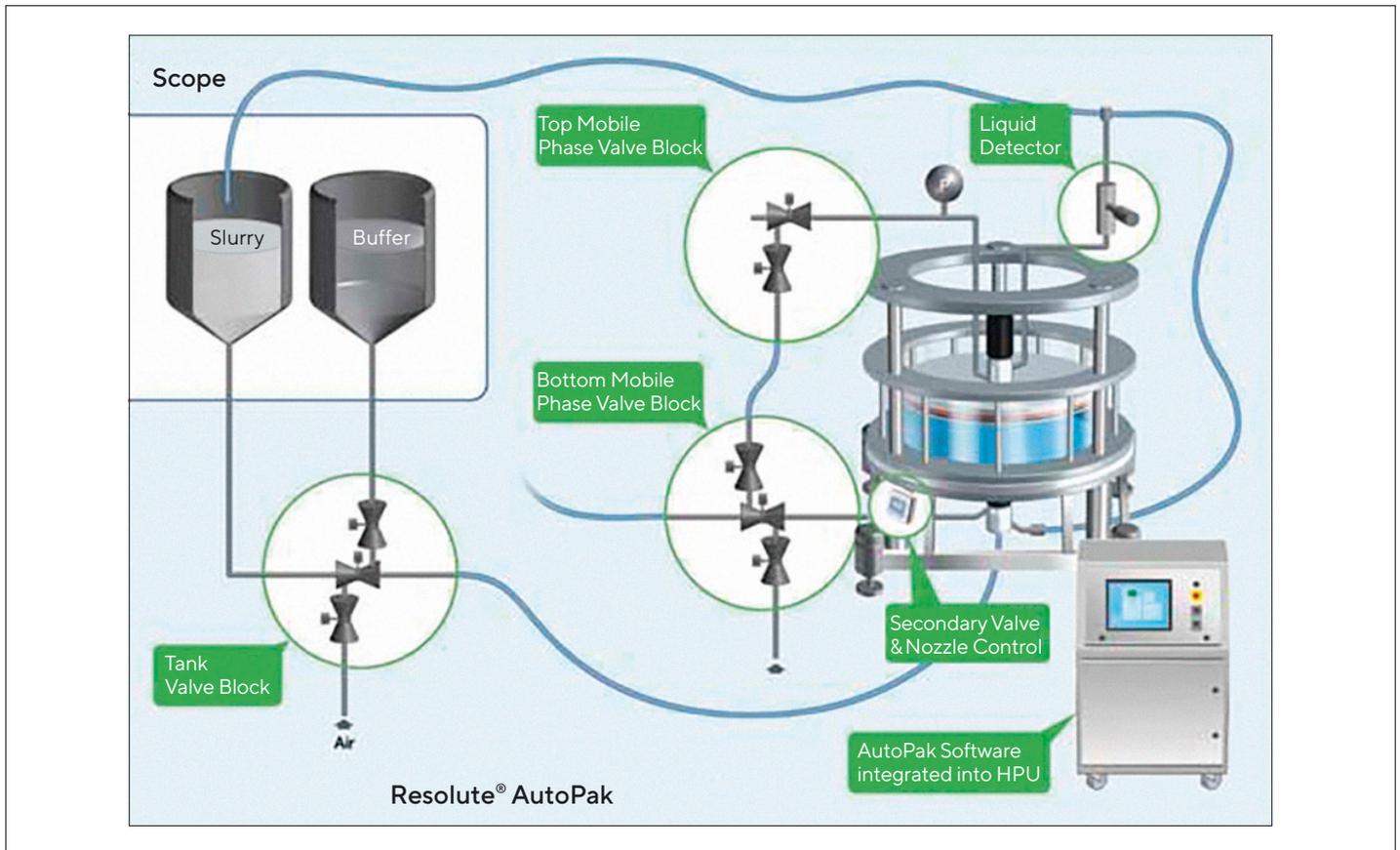


Figure 2: Typical AutoPak System Schematic

Ordering Information

AutoPak can be quoted for inclusion with any new Resolute Hydraulic column, please contact your local representative for details.

Sales and Service Contacts

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