

UOP ADSORBENT CHAMBER CONTROL SYSTEM

Retrofit ACCS Solutions

The UOP Adsorbent Chamber Control System (ACCS) is a proprietary Control system package designed and built to provide optimal control of Sorbex™ processes. UOP has over 120 ACCS units installed worldwide with proven operating experience. A global network of technical support services backs UOP's processes and products.

Designed to provide optimum and reliable control of the Rotary Valve (RV), chamber circulation flows, pressures, and the net stream flows, the ACCS provides the licensee a way to help maximize the efficiency and performance of their Sorbex process unit.

PROCESS DESCRIPTION

Sorbex processes involve the continuous separation of a desired component from a multi-component feedstock using a simulated moving bed of solid adsorbent and counter-current extraction. The UOP Rotary Valve (RV) indexes the feed, desorbent, raffinate, and extract streams sequentially to and from the adsorbent chamber beds.

CRITICAL REQUIREMENTS

The precise control of the Rotary Valve, the adsorbent chamber circulation, pressures, and the net stream flows is often critical to optimal process performance. Maintaining maximum product purity and recovery requires precise control of the feed and product streams intermittently being introduced and withdrawn from the adsorbent chambers.

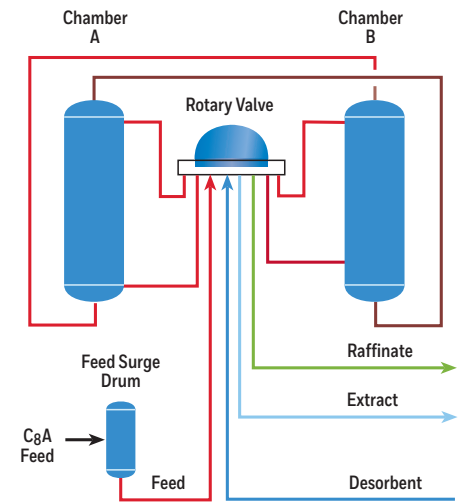
With multiple interacting flows and pressures, maintaining the optimal performance of the adsorbent system depends on tight regulatory loop control, Rotary Valve sequencing and accurate process variable calculations. This necessitates an almost instantaneous response to process changes to minimize flow and pressure transients. It also requires accurate timing and integrated control of the RV with flow rate changes.

UOP'S SOLUTION

As the licensor of Sorbex processes, UOP is in a unique position to offer a control system package that meets these exacting process requirements. The ACCS package provides licensees with the benefits of UOP's world-leading process technology, technical refinements and continuous product development in one robust and powerful control system package.

UOP has incorporated many unique features into the ACCS. Sophisticated RV stepping logic and diagnostics have enabled Sorbex process operators to enjoy benefits like enhanced process performance and high on-stream reliability.

FIGURE 1 – Adsorbent Chambers and Rotary Valve



ACCS BENEFITS

- Helps to maximize the efficiency and performance of the Sorbex process through control of the Rotary Valve of the Rotary Valve, chamber circulation flows, pressures, and the net stream flows
- Steadier operation due to improved overall control of the Rotary Valve, the flow, and pressure loops around the adsorbent chambers
- Operation of the Sorbex unit will not be compromised by any single component failure, as all ACCS components are either redundant or fault-tolerant

The ACCS is innovative in system architecture, packaging, software and control. Its modularity allows each application to be implemented in the most cost-effective manner by simply selecting and connecting individual cards (e.g. control, I/O, communication).

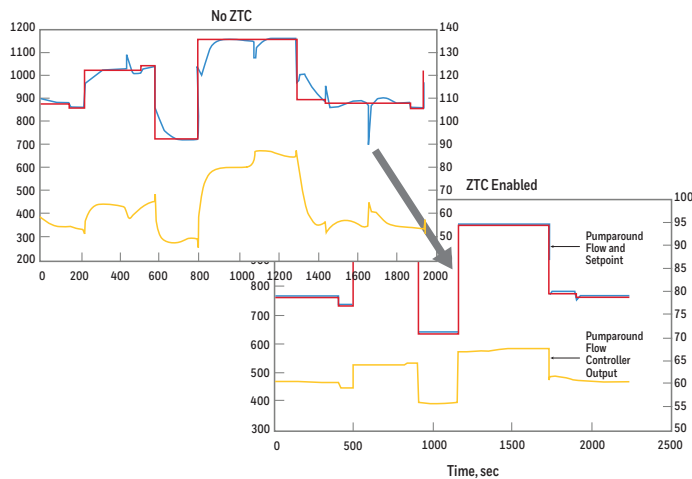
With fully redundant control system hardware and comprehensive fault detection diagnostics, the ACCS offers excellent system reliability and availability. This approach helps ensure maximum process unit on-stream performance.

In addition to being a self-contained, stand-alone system, the ACCS can be integrated or communicate with a DCS and can be easily connected to a plant wide information/ optimization system.

ACCS TOP FEATURES

- Zone Transition Control (ZTC) for Rotary Valves step optimization of pumparound, pusharound, and raffinate control valves. This feature can potentially improve recovery between 1-3%
- Auto PV Switchover (Turbine Meter to ΔP Meter or ΔP Meter to ΔP Meter) – senses if the meter is failing and auto switches to backup meter. This can be done with no process disturbance, avoiding a shutdown.
- Performs Plant Calculations for Pumparound Zone and Net Stream Setpoints – allows for high purity and recovery
- High-speed data collection – used for process troubleshooting or tuning with data samples every 100 milliseconds

FIGURE 2 – Typical Chamber Circulating Flow Trace



APPLICATIONS

- **Parex™ process** - recovers para-xylene from mixed xylenes
- **MX Sorbex™ process** - recovers meta-xylene from mixed xylenes
- **Molex™ process (kerosene)** - recovers *n*-paraffins from kerosene
- **Molex™ process (motor fuels)** - recovers C_5/C_6 isomers from a mixed C_5/C_6 stream
- **MaxEne™ Process** - recovers *n*-paraffins for processing from the C_5/C_{10} stream
- **Ebex™ process** - recovers ethylbenzene from mixed xylenes
- **Olex™ process** - recovers olefins from mixed hydrocarbons

For more information

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WHY SHOULD YOU CONSIDER ACCS RETROFIT?

With the pace of technology advancements, system components are becoming obsolete more quickly. The UOP control system retrofits have been developed to offer the following benefits:

- Overcome obsolete spare part availability
- Utilize current technology
- Additional functionality features
- Minimize process upsets
- Fully redundant control system hardware and comprehensive fault detection diagnostics
- Helps to maximize process unit on-stream performance

ACCS RETROFIT FEATURES

These features can be added to help improve functionality and performance of the ACCS or Rotary Valve. When combined they may require an ACCS retrofit:

- **Soft Start Capability** – Soft Start takes away impact forces by closing the gap between the pawl and ratchet wheel. This allows for a gentler push and less impact on drive components which contributes to more on-stream reliability and reduced unplanned shutdowns. This upgrade may also require a new hydraulic system.
- **RV Proximity Switch Upgrade** – Upgraded proximity switches improves the accuracy, repeatability, and on-stream reliability of the rotor plate position during operation.
- **RV Resolver Upgrade** – Electrical positioning device that vastly increases monitoring and positioning capabilities of the rotor plate. It helps increase accuracy, repeatability, and reliability of rotor plate positioning.
- **Turbine Meter** – Used in critical services of pumparound flow for mass balance and calculating recovery which requires a flow meter that provides high accuracy readings. Custom calibration curve included only when purchased from UOP.
- **Variable Frequency Drive (VFD)** – Installed on Pumparound and Pusharound pumps will help to reduce wasted energy. VFD reduces energy consumption by varying the speed of the motor. The energy savings are made possible by removing the pressure drop normally taken across the control valves

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