

Global Retailer Reduces Downtime, Improves Diagnostics for Tilt-Tray Sorters with Robust Industrial Control System From Rockwell Automation

Pyramid Controls Aids International Retailer in Migration from PC Control System to Allen-Bradley ControlLogix Controllers

Challenge

- Tilt-tray machines controlled by outdated PC-based control system leading to significant periods of downtime and hundreds of thousands of dollars in lost revenue annually
- Little insight into cause of machine breakdown, product tracking and key performance indicators (KPI)

Solutions

Integrated Architecture® Control System

- Allen-Bradley ControlLogix programmable automation controllers improve system control, reliability and security
- Enhanced diagnostics and preventative maintenance capabilities provide insight into machine breakdowns and production analytics via Pyramid Director WCS

System Design and Delivery

- Rockwell Automation Solution Partner, Pyramid Controls, engineered, configured and implemented the complete control and software system solution

Results

Improved product traceability

- Significantly reduced lost product – saving the global retailer hundreds of thousands of dollars annually

Reduced downtime

- Detailed performance metrics and preventive maintenance – drastically reducing machine downtime

Rockwell Automation Solution Partner



Pyramid Controls helped one of the world's largest retailers upgrade the control system at a key distribution center.

Background

Modern merchandising is built on a complex system aimed at delivering the right retail item to the consumer at the right time. At the heart of this system is the distribution center. Here, most of the goods sold in major department stores – from dresses and suits to appliances and accessories – arrive in bulk shipments from manufacturers, and are sorted and shipped to hundreds and even thousands of retail locations.

Major retailers maintain massive distribution centers across the country, all with the goal of ensuring that each store location is well-stocked with the products consumers want, when they want them. This requires not only the appropriate number of each item but also the correct variety of colors, sizes, etc., as well.

Rather than sorting millions of items by hand, major department stores employ sophisticated equipment, Tilt Tray Sorters, and software to separate items for distribution to their retail destinations. Packing-sorter machines are pivotal in this process. Typically, they carry items from the induction station – where workers unload wholesale merchandise from palletized cartons, and place individual items on the Tilt Tray sorting machines – to be sorted to chutes that are designated as shipping destinations for different retail locations.

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Challenge

In 2012, one of the world's largest retailers decided to upgrade the control system at a key distribution center. The facility used an aging and outdated PC-based control system and software with limited visibility of machine diagnostics, production statistics and product tracking information of its high-speed tilt-tray sorters. These issues and minimal functionality of the existing system resulted in increased downtime and lost product.

The tilt-tray sorters (also known as loop sorters) are highly sensitive to the timing at which internal switches needed to fire (within 50 milliseconds). Missing the switch fire window would shut the entire sorter down. In addition to eliminating shutdowns, the retailer needed a solution that could synchronize more than 70 motors on each of the four packing-sorter lines.

The retailer also was concerned with lost product in the sorter and its inability to track to particular store locations. This lack of insight and product tracking resulted in high rates of product shrinkage (lost inventory), which collectively cost the retailer hundreds of thousands of dollars in lost inventory annually.

Solutions

Plant managers identified three primary needs from a new control solution: optimized performance/product tracking, reduced downtime and improved system reliability. After vetting several system integrators, the retailer chose Rockwell Automation Solution Partner, Pyramid Controls, which specializes in developing solutions that manage and control distribution systems.

One major factor in favor of selecting Pyramid Controls was its promise not to disrupt work at the distribution center during installation of the new control system.

"That meant we had to work after hours and on weekends to meet the deadline," said Mukesh Ram, president of Pyramid Controls. "But there was no choice, considering the volume of merchandise flowing through the facility every day."

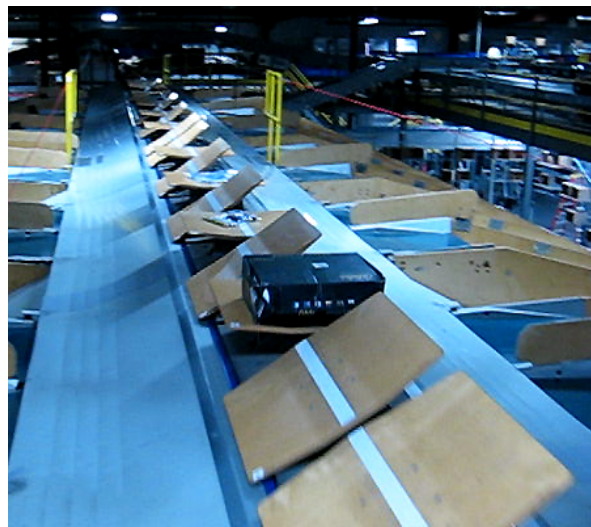
Pyramid Controls suggested an industrial control system driven by the Allen-Bradley® ControlLogix® programmable automation controllers (PACs) from Rockwell Automation in place of the legacy PC control system. Traditionally, PACs were not considered for sorter solutions because it was believed that PC-control systems provided faster, more reliable performance.

Over the course of multiple weekends, Pyramid Controls replaced the outdated PC-based system with eight ControlLogix PACs – two to control each of the four primary packing sorters. The controllers are networked to the devices on the sorting line via ControlNet™, which provides ongoing feedback to the controller from the system I/O. The controller then communicates via EtherNet/IP™ with the Director Warehouse Control System (WCS) developed by the Pyramid Controls team.

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ControlNet and EtherNet/IP share the Common Industrial Protocol (CIP™), which allows complete integration of control with information and Internet technologies. CIP also allows companies to integrate I/O control, device configuration and data collection across multiple networks. This ultimately helps minimize engineering and installation time and costs while maximizing return on investment.

The new control system provides advanced diagnostics and analysis of the sorting line directly to the Director WCS so operators can be notified of errors and where they are occurring. When operators have problems, they can call Pyramid Controls for assistance. The Pyramid Controls team can make adjustments to the system remotely via VPN access. Because of a TechConnectSM service contract with Rockwell Automation, Pyramid can work with Rockwell Automation on additional troubleshooting, when needed.



Results

The new control system immediately delivered a significant reduction in lost inventory by doing a thorough job of tracking merchandise, from the induction point to packing chutes and highly detailed reporting capabilities.

Additionally, by integrating the controllers into the distribution center's existing packing line, Pyramid Controls was able to provide the customer with a consistent switch-firing within the machine timing requirements, more than satisfying the machine requirement of a switch-firing window of less than 50 millimeters. The retailer gained unified and reliable motor control, and increased overall system reliability. Time devoted to preventive maintenance and troubleshooting was also reduced because controllers do not require regular software updates and aren't accessible to multiple networks, thus decreasing exposure to viruses, malware and other PC complications.

"The customer is so pleased with conversion of the first three machines that they contracted us to design and implement solutions in two additional machines and want to work with us on expanding the machines, as well," Ram said. "That wouldn't have been possible without our collaboration with Rockwell Automation."

The Logix control platform reduced product shrinkage, boosted overall equipment effectiveness and, for the first time, provided a complete diagnostic system – ultimately giving this international retailer the information necessary to optimize machine performance.

The results mentioned above are specific to Pyramid Controls' use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.



Rockwell Automation and PartnerNetwork companies collaborate to help you develop an ongoing approach to plant-wide optimization, improve your machine performance and achieve your sustainability objectives.

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Pyramid Controls is a full service software and control system solutions provider for material handling equipment and the warehousing industry. Some solutions provided by Pyramid include:

- *WCS Software*
- *PLC Controls Solutions for Conveyors, case sorters and loop sorters*
- *Automated Print/Apply Systems*
- *Pick/Put solution via lights and terminal*
- *MDR conveyor solutions*
- *Retrofitting Control and software systems for existing MHE systems*
- *Automated Packing Slip Printing/insertion*
- *WCS Integration to WMS/ERP systems*
- *Other warehouse software and controls solutions*

Pyramid provides 24/7 support for to insure customers' distribution and fulfillment centers are in good running condition as part of its commitment to its customers.

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