

TIMING IS EVERYTHING

A timely system retrofit with new-generation drives and controls gets protective packaging producer back on productive track

As a leading manufacturer of a broad range of protective packaging products and integrated packaging systems for pharmaceutical, automotive, electronics, catalog and mail-order, publishing and cosmetics industries, Toronto-based **Polyair** knows all about the value of protecting one's assets and investment to the fullest.

So when the company's long-serving converting system—used to produce air-cell-lined mailing envelopes—became increasingly plagued by frequent shutdowns caused by outdated controls and component failure, it knew it had to act quickly to protect perhaps its greatest asset, the goodwill of its customers.

An important part of Polyair's extensive protective packaging line, the converting system combines bubble-wrap and recycled paper or polyethylene and converts it to padded envelopes—typically sold in office-product stores and at the post office.

In a nutshell, the system assembles two rolls of plastic film to make air-filled cells, laminates the air-filled cells to paper, and then folds, glues and cuts the material to produce the final product.

Due to the considerable expense and downtime that a brand new system installation would require, the management of Polyair, a division of **Polyair Inter Pack Inc.**, decided to find ways to retrofit and upgrade the existing system back to its efficient, productive and reliable ways.

A NEW START

Because the original system incorporated outdated, and now-obsolete, drive and control products, Polyair approached leading industrial automation technologies supplier **Bosch Rexroth Corporation** of Hoffman Estates, Ill., to see if its outdated components could be easily replaced with the latest-generation technologies.

In turn, Bosch Rexroth contacted **Custom Control Solutions (CCS)**—Bartlett, Ill.-based application software and integration services provider specializing in motion control—to design a retrofit solution that would bring the equipment's antiquated controls up to speed.

To start, CCS evaluated the system's performance to identify any major control and communication problems. It was during this evaluation that CCS president Dave Stuber discovered a PLC (programmable logic control) timing error responsible for the frequent shutdowns and component failure.

According to Stuber, the webs of recycled paper needed to match precisely with the webs of bubble wrap for the converting system to be optimized. In Polyair's case, however, the system's heat-sealing bars that join to seal-and-form the sides and the bottom of the envelope were so out of sync with the web motion, that they were often still closed when the webs resumed movement.

As a result, the servomotor was pulling material through the system while the brake near the material infeed station was still engaged.

Stuber's examination subsequently traced the servomotor problem to a PLC logic timing error in the feed-cycle, which caused momentary overload of the feed motor during each machine cycle.



After a comprehensive retrofit of its drives and controls with the latest technologies, this envelope converting system at Polyair's Toronto facility now runs more efficiently than ever before.

After CCS conducted an in-depth study of the existing program logic and machine timing, Stuber and his team were able to identify and correct the problem with a complete retrofit of the drives and the controls package.

"Bosch Rexroth provided a high-functioning, open-motion control solution for the Polyair converting system, which greatly simplified the task of modifying the motion control communication to the existing PLC," says Stuber.

The specific Rexroth components involved—all supplied by the company's Electric Drives and Controls technology group—included a **PPC** integrated motion-and-logic controller with **SERCOS** interface; two synchronous AC servomotors; and two **EcoDrive03** intelligent servo drives, also with **SERCOS** interface.

The supplied synchronous AC servomotors are designed for all requirements from one to 260 Nm, while the compact **EcoDrive03** units offer a broad power range, comprehensive integrated functionality, and a very attractive price/power ratio.

During operation, one servomotor is responsible for pulling the web materials through the converting process from the roll stand, through laminating and cutting stations, and out the discharge end.

At the same time, the other servomotor actuates the cutting action that separates finished envelopes from the continuous rolls.

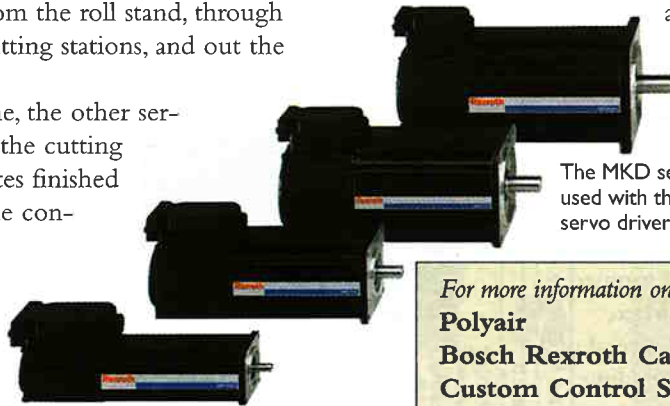
In addition to



The EcoDrive03 intelligent servo drive with SERCOS interface.



The full family of EcoDrive03 servo drives.



The MKD series servomotors used with the EcoDrive03 servo drives



The PPC-R22.1 integrated motion-and-logic controller with SERCOS interface.

installing the new controls, CCS implemented a comprehensive new communications program to modify the original PLC, which remained part of the upgraded system.

As a finishing touch, CCS also designed a new control panel, containing the new drives and PPC motion controller and a new operator console, with a color touch-screen HMI (human-machine interface).

The old operator interface and job recipe storage program used an **Epson** model PC running *Windows 3.1*. Storing more than 100 different HMI screens, this set-up resulted in extremely cumbersome and time-consuming operator training, Stuber reflects.

EASY TO UNDERSTAND

By reducing the number of screens down to five, while still enabling all the critical functions required for the operator to run the machine, CCS provided a system that all the operators have found much easier to understand and operate, according to Stuber.

"Since CCS completed the drive and control retrofit on the converting system, Polyair has experienced significantly greater uptime, which, at an operating cost of \$1,000 per hour, quickly adds up," Stuber reflects.

Moreover, Stuber points out that the retrofit caused virtually no disruption to normal production at the Polyair plant, while the newly-corrected and coordinated timing between the web infeed, heat-sealing bars and brakes, has drastically reduced the amount of scrap materials generated during production—saving

the plant an estimated 2,000 linear feet of bubble-wrap and paper each day.

Likewise, the HMI screen reduction has streamlined operator training, now achieved in about half the time, and Polyair estimates that it now saves up to 20 minutes during every changeover from one envelope size to another—directly as a result of the simplified design and consolidation of the HMI recipe screens.

As a result of the unqualified success of this project, Polyair is already considering additional equipment retrofits involving both CCS and Bosch

Rexroth, according to Stuber. □

For more information on:
Polyair
Bosch Rexroth Canada
Custom Control Solutions



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