

# Drive & Control profile

## Controls retrofit boosts printing production for packaging manufacturer



Key to the retrofit was the versatile IndraMotion MLC motion logic controller, which offers innovative software and firmware functions, easy engineering and open system interfaces. The IndraMotion MLC provided a scalable motion control solution that was easy to program for the laminator's motion sequences, while offering long-term value to extend the machine's operating life.

An industry supplier of flexible packaging—used by medical, pharmaceutical, consumer products and food companies—recently began experiencing issues with the laminator component of one of its flexographic printing presses. The unreliable laminator, which has its own controller and human machine interface (HMI) operator screen, severely limited the entire machine's production capabilities.

In order to reestablish the machine's typical production rates, the company chose to complete a partial retrofit to the controls technology on the laminator, which is an adjunct system to the main press. The laminator received a new motion logic controller and HMI platform from Bosch Rexroth Corporation (Charlotte, NC [www.boschrexroth-us.com](http://www.boschrexroth-us.com)).

### Challenge:

Improve output and extend the lifespan of an older printing press laminator without having to do a full machine retrofit

### Rexroth Solution:

- Replace outdated CLC controls platform with modern IndraMotion MLC motion logic controller
- Add HAC drive component to ensure communication between older drives and new controller using existing Sercos automation bus
- Upgrade HMI to newer graphical interface with touchscreen capacity
- Replace older I/O card with newer high-speed I/O card

### Results:

- Added 10 years to machine lifespan
- Avoided \$70,000 in parts costs
- Increased output by 75 percent
- Improved reliability, reduced maintenance
- Expanded capabilities
- Required minimal downtime for controls retrofit
- Saved space in control cabinet with newer technology
- Supported comprehensive, efficient code for motion control

## Unexpected challenges call for retrofit

The company uses the flexographic printing press, which is approximately 25 years old, to print on poly film for items such as fertilizer bags and chocolate chip bags. The mechanics and existing Rexroth DiAx servo drives and accompanying Rexroth MHD series servo motors on the six-axis laminator were able to perform at the levels required; however, the controller electronics had become obsolete over the years and experienced intermittent issues which often slowed or halted production for extended lengths of time.

The company decided to proactively find a solution before the problem got worse, which could have necessitated a costlier and more complex solution as well as lengthier downtime. During consultations, some companies recommended a full retrofit or even a full machine replacement. However, the packaging manufacturer wanted to avoid major unplanned upgrades because those would require more investment and increased downtime.

Instead, the company worked with Industrial Automation Solutions, Inc. (IAS-West Allis, WI [www.iasworldwide.com](http://www.iasworldwide.com)), a long-time trusted supplier, to come up with a retrofit solution. "It was a unique challenge for us," said Paul Szefflinski, engineering manager at IAS. "It's not often that we see such old drives and motors still in use. We wanted to reuse as much as possible, because the mechanics were still good and because it was the most cost-efficient option. The fact that we had very little time and that all the work had to be done on-site added to the challenge, especially since the machine is three stories tall."



The mechanics and existing Rexroth DiAx servo drives (similar to the ones shown here) and the accompanying Rexroth MHD series servo motors on the six-axis laminator were still good.

IAS worked closely with drive and control experts at Bosch Rexroth to determine if the existing equipment could be reused. Because many of the components were originally manufactured by Rexroth, the partnership came naturally. From there, IAS and Rexroth recommended a partial controls retrofit of the laminator and an incremental upgrade of equipment, which would require less downtime and would be less expensive.

### New components bring old machine up to date

The specific aspects of the partial retrofit solution were decided through teamwork between IAS and Bosch Rexroth, with Rexroth applications experts providing significant support to ensure the project's success.

The first step was to replace the CLC, an outdated control platform that had originally been sourced from Rexroth.

While the CLC itself was still in good working order, the computer terminal screen to which it was connected had become almost unreadable from age, which in turn made the overall system unreliable. As a replacement, IAS opted for Rexroth's current-generation IndraMotion MLC motion logic controls platform. The IndraMotion MLC is a compact and versatile programmable logic controller (PLC) that offers innovative software and firmware functions, easy engineering and open system interfaces. It provided IAS with a flexible, scalable motion control solution that was easy to program for the existing laminator's motion sequences, while robust enough to afford long-term value to extend the unit's operating life.

Most importantly, the IndraMotion MLC is engineered to work with the laminator's existing Rexroth DiAx servo drives, which are older drive units that continue to operate well and did not need to be replaced with this upgrade.

"We didn't feel as though Rexroth was just trying to push a newer platform," Szefflinski said. "They provide support, components and electronics that work with legacy technology when it's called for. The intent from Rexroth was to provide our customer with a way to transition without having to throw away their investments in the drives and motors."

Since the IndraMotion MLC is a current generation controls platform, IAS and Bosch Rexroth recommended using Rexroth IndraControl L25 controller hardware, combined with Rexroth's cost-efficient IndraControl VEP 50 HMI, for operator control on the laminator. The VEP 50 offers a user-friendly, state-of-the-art graphical

interface with touchscreen control. For machine communication, the team decided to continue using the high-speed Sercos® II automation bus, which was already being used to connect devices within the controls platform.

To handle the Sercos signal conversion between the older existing DiAx analog servo drives and the newly installed motion logic controller, IAS incorporated a Rexroth HAC01 housing component into the controls platform. Located in the control cabinet with the drives, the HAC provides the physical framework where an individual drive system control card, or section, could be inserted to provide the analog conversion for the master encoder signal between the DiAx drives and the IndraMotion MLC. Bosch Rexroth recommended the HAC configuration for the signal conversion instead of the typical and more costly alternative: purchasing and installing

an entire extra drive in order to provide this functionality.

To complete the upgrade, a faster I/O card compatible with the IndraMotion MLC replaced an older I/O card that was used with the CLC controller. The upgrade to a faster I/O card enabled these components to operate at maximum efficiency.

IAS counted on significant support from Bosch Rexroth to help program the motion function blocks and implement the motion control. “Their experts were always available for any questions that we had,” Szefflinski said. “They gave advice to help us make the code as comprehensive and efficient as possible.”

In total, IAS and Bosch Rexroth upgraded the controller, HMI and I/O card for the laminator. With these modifications in place, the system now has a complete controls architecture that can effectively

communicate with all the existing servo drives and motors.

**The result: greater output, longer lifespan**

Bosch Rexroth equipment is designed to be upgradable and updatable as technology progresses, so IAS found it easy overall to do a partial retrofit instead of a full machine replacement.

The process was also a fast one that required little downtime; the retrofit was completed and the machine was back up and running within a week. And because the newer technology takes up less space than the older equipment, adjusting the control cabinet was easy, too.

In the end, the retrofit was exceedingly successful and provided significant cost savings. Szefflinski estimates that the company saved about \$70,000 in parts alone by opting for a partial retrofit rather than a full retrofit. “The retrofit helped our client protect its existing investment in the equipment,” Szefflinski said. “Rexroth components really can last for decades.”

The retrofit is already paying off. The manufacturer wanted the machine to function for at least another two years. Instead, it will be usable for at least another decade, and the new controls platform is expected to last at least another 20 years. During these next few decades, Rexroth will continue to support its legacy technology, thereby helping companies like this one avoid unnecessary expenditures on new equipment.

The retrofit also boosted output. The machine in its new state had a



Completing the retrofit, IAS opted to use a Bosch Rexroth VEP series HMI, which features a user-friendly, state-of-the-art graphical interface and touchscreen control.

material output of 800 to 900 feet per minute. With its ongoing issues, production had been down to about 400 feet per minute. Now, it's back up to approximately 700 feet per minute, close to its original output and a 75 percent increase from its previous output capability. It also has improved reliability, reduced maintenance costs and an overall boost in performance.

The company plans to continue performing incremental upgrades to the machine, and the new hardware allows for that. "Rexroth technology is very customizable and long-lasting," Szeplinski said. "Customers can pick what they need based on prices and functions, and they can choose to add new capabilities down the road. Rexroth really offers scalable solutions."

Workers are looking into putting a remote secure connection on the machine, which would enable capabilities like remote backups. This upgrade, which is compatible with the new Rexroth MLC, would cut down on travel time as well as safeguard against a system failure. This function was unavailable with the CLC, the original controller that the printing press previously used.



Located in the control cabinet with the drives, the HAC provides the physical framework (left) where an individual drive system control card, or section, could be inserted (right) to provide the analog conversion for the master encoder signal between the DiAx drives and the IndraMotion MLC.

The company is so satisfied with the retrofit results that it's planning on using IAS and Bosch Rexroth for future projects. There are four other laminators with similar setups that the manufacturer would like IAS to upgrade in the near future. "A partial retrofit is an ideal solution for companies using legacy equipment,"

Szeplinski explained. "When done properly, it protects investments while keeping production rates high, with very little downtime."

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