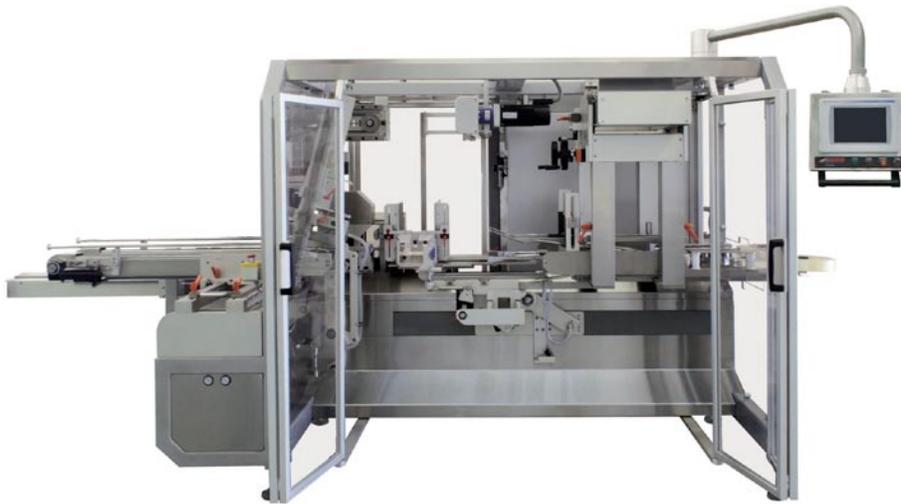


Drive & Control profile

Rexroth Automation Technology Drives Efficiency, Lowers Cost for Serpa Casepacking Machine



Serpa turned to Bosch Rexroth, the one company that could provide the product expertise and applications support for an integrated electric drive and control and linear motion solution.

Machine control, programming and linear motion system helps Serpa Packaging Solutions develop versatile servo-driven balcony casepacker

The old saying, “If it ain’t broke, don’t fix it” is a philosophy many companies apply in their product development plan. [Serpa Packaging Solutions](http://www.serpapackaging.com) (Visalia, CA — www.serpapackaging.com), however, isn’t your typical company. Ever since Fernando Serpa began making end-of-line

packaging machinery in 1981, the company’s philosophy is based on trying to improve upon its existing products. That’s why Serpa reintroduced its signature [P200 Balcony Casepacker](#).

Serpa turned to [Bosch Rexroth](#), the one company that could

Challenge

Develop a scalable, cost-effective servo-driven balcony casepacker with easy access and tight synchronization

Bosch Rexroth Solution

- IndraDrive digital intelligent servo drives
- IndraDyn synchronous servo motors
- Linear Ball Rail® System
- IndraWorks engineering and programming software suite

Results:

- Efficient, easily accessible, tight synchronization, smooth motion
- Reduced installation and startup times by 30 to 35%
- Uses 25% fewer parts than on previous models of the machine
- Internal lube reservoirs in Ball Rail roller block help reduce maintenance costs
- Rexroth system helps reduce hardware costs by 40%
- Electronic cam shafting for rapid tool-free changeovers

provide the product expertise and applications support for an integrated electric drives and control and linear motion solution. To help reduce costs and improve machine efficiency, Serpa also collaborated with local automation distributor [Applied International Motion \(AIM\)](#) — a Womack Company (La Verne and Benicia, CA www.aimotion.com) to specify and implement the Bosch Rexroth motion and servo control system.

One-of-a-kind Design for Easy Access

Designed for pharmaceutical, nutraceutical, personal care and medical device packaging, the P200 is an advanced seven-axis servo-driven casepacker that can pick and erect 20 cases per minute. It was the first balcony-design casepacker designed and built in the United States. Instead of a conventional frame design, the balcony design uses a pair of bi-fold doors that open up to provide convenient full walk-in access to all of the drive components from the operator side of the machine.

Along with providing an important maintenance advantage, the balcony design is especially important for pharmaceutical packaging because it provides open entry to retrieve product waste. With stainless steel fall-through construction, the P200 also meets all sanitary and FDA validation requirements. The FDA requires traceability and accountability of all medicinal waste. The end-packaging company is responsible for reporting any unpackaged product. With the P200, the



The scalable design of the IndraDrive allows Serpa to purchase only the exact features they need.

operator can simply retrieve any unused product inside the machine, making it easier to track.

Rexroth Adds Flexibility, Synchronicity

According to Serpa, the P200 is the first casepacker to be able to run cases and trays on the same machine. The machine collates the product to achieve the correct pattern, loads the product into the case or tray, and seals and discharges it. The servo-controlled erector motion has two cam shaft profile axes that drive a parallel link arm. The arm picks up the case and erects it in the same area where the loading takes place. Because the loading and case erection occurs in the same area, it reduces the overall footprint and maximizes the speed of the P200. The standard machine footprint is only about eight feet long and 6.5 feet wide.

Using Rexroth servos helped simplify the overall design for easy access and a smaller footprint. For the P200, Serpa opted for Rexroth's [IndraDrive intelligent digital servo drives](#), [IndraDyn servo motors](#), and a [linear Ball Rail® system](#). The motion and logic was programmed with Rexroth [IndraWorks software](#).

Instead of a mechanical drive, Serpa used Rexroth's servo system to create an electronic line shaft with cam profile movement. The P200 uses multi-axis synchronization with the ability to change motion profiles on the fly. Of the seven axes, four are synchronized using electronic cam shafts and three are point-to-point axes. To achieve proper forming of the case, the erector and walking beam motion are tightly synchronized through [SERCOS III](#) communication with the Rexroth IndraDrives. The drives use cross-

communication linking, with only one drive needing a fieldbus interface. The other drives use SERCOS to communicate to the PLC from the master drive, no matter which fieldbus is chosen.

The powerful and cost-effective IndraDrive servo drives are unique because they offer many advanced features, including **distributed intelligence** to close all the loops down in the drive. The drives also provide 230 to 480 VAC autoranging input voltage, absolute feedbacks to eliminate homing, and a built-in “personality module” or SD memory card for laptop-free replacement in minutes. The drives can store up to eight electronic cam profiles of 1,024 points each.

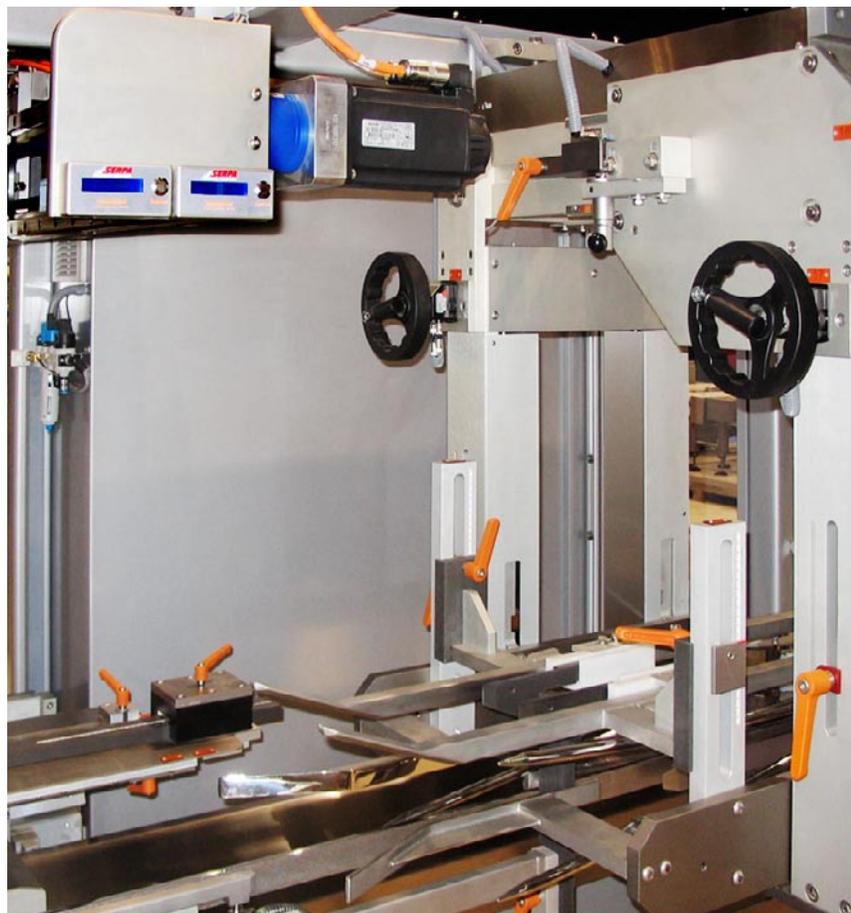
The IndraDrive servo drive’s internal virtual master axis and precise synchronization allow smooth motion even while the machine is running at high speeds. This reduces the loads placed on the mechanical parts of the machine, which in turn provides a level of high reliability. All motion and programmable limit switch (PLS) outputs are based on a virtual master axis. Serpa also used Rexroth IndraDyn synchronous motors which offer complete scalability and compact construction with increased torque density, absolute encoders and high-resolution resolvers.

To handle the engineering/programming, Serpa and AIM used Rexroth’s IndraWorks software suite, which was vital

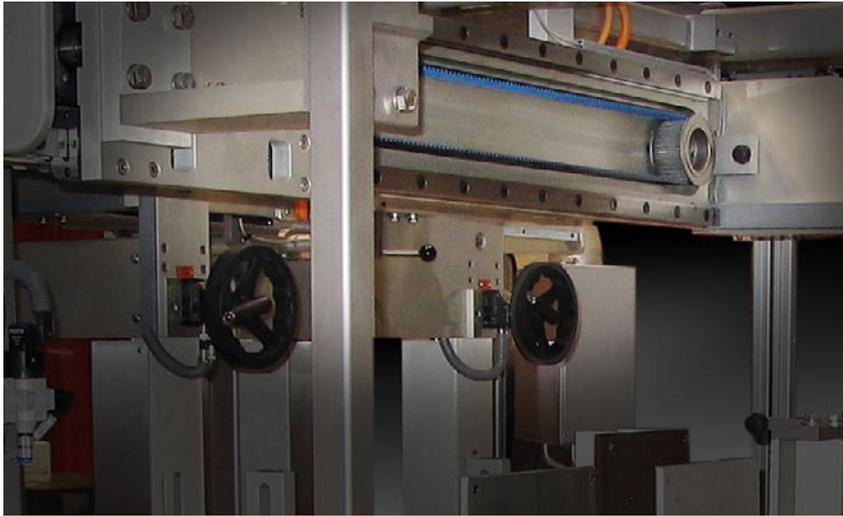
to building the types of cams that were needed. With project planning, programming, parameterization, visualization, operation, diagnostics and maintenance capabilities all in one package, IndraWorks is a single engineering suite for data management and open communication that covers the entire range of engineering tasks and tools.

In addition to servo control, smooth linear motion was also necessary for the P200. Serpa chose a Rexroth linear Ball Rail system to

help ease the load. The cantilever design of the balcony case packer causes large moment loads on the linear bearings. Rexroth linear Ball Rails have very high rigidity and help reduce deflection of the machine components. This leads to increasing reliability of the machine, allows for higher speeds, and helps axes run smooth at higher speeds. The Ball Rails also help to lower maintenance. With lube reservoirs located inside the runner block, the Ball Rails do not need to be lubricated as often, thereby reducing maintenance costs.



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Rexroth Components Improve the Bottom Line

Rich James, Serpa's director of marketing, said Bosch Rexroth components helped them develop a precise machine that offers scalability, straightforward programming, easy start up and the versatility to run off an internal controller or in combination with any external PLC as well.

"Other servos did not solve our automation needs as efficiently

or as cost-effectively as Bosch Rexroth," explained James. "Bosch Rexroth has supplied a solution for our machines that is not only easy to program and start up, but saves time and money."

By opting for a Rexroth drive and control system over other controls suppliers, James said Serpa reduced its installation and start up times by 30 to 35 percent. In addition, Serpa was able to use 25 percent fewer parts on the P200 compared

to their previous model because it now uses fewer drive components and fewer cables.

"Besides reducing the part count, another advantage Rexroth provided was helping with rapid changeover," said James. "We can do a rapid, no-tools changeover in five minutes or less." The fast changeover is attributed to the ease of switching axes to different electronic cam shaft profiles.

James added that the scalable design of the IndraDrive allows Serpa to purchase only the exact features they need. Because of the IndraDrive internal virtual master and PLS, it eliminates the need for an external PLS and master encoder. Using a Rexroth drive and control system equated to a significant cost savings. "Overall, with Bosch Rexroth our hardware costs per machine are almost 40 percent less than with other brands we've used at Serpa," said James. "We're very happy with the final machine and the benefits of the control and linear motion system."

Rexroth
Bosch Group