Drive & Control
profile

New Stand-Up Pouch Machine Promises Quantum Leap in Speed

Since 1969, GN Packaging Equipment of Mississauga, Canada, has been a global leader in the design and manufacture of quality pouch machinery for the flexible converting industry. The company's custom-engineered machinery, including the latest microprocessor-controlled servo technology and instrumentation, serves a wide range of converting equipment for stand-up, liquid, medical, anti-static, three-side-seal/vacuum, courier, packing slip, bubble envelope, and zipper plastic bag applications.

GN's latest design, the GN26SPELS Stand-up Pouch machine, was engineered for high-speed runs with faster changeovers using a motion control solution comprised of Rexroth's ECODRIVE03, PPC controller, and MKD motor family. GN worked directly with Rexroth engineers to design the stand-up pouch machine that runs up to 80 percent faster than competitive equipment.

GN Packaging's new stand-up pouch machine.

Sealing the Deal

Used to package various products, including juices, cookies, birdseed, and fertilizer, GN's stand-up pouch machine creates a pouch by folding a single sheet of material in half with a gusset at the bottom. At 26 inches (660 mm) wide, the single-lane GN26SPELS is designed to run PET/PE laminated materials at higher speeds than ever before, while also allowing the pouch to include print in the gusset area and a recloseable zipper.

"We had a customer who was looking for a quantum leap in stand-up pouch speed," recalls Steve Gosling, GN's director of new business development. "Our philosophy is that speed is relative to control and dwell time."

In order to achieve higher speeds while maintaining control, GN adopted an independent servo layout. By using electronic line shafting, or ELS, GN realized it could work out delays and respond faster with perfect accuracy and repeatability—a design idea that the company is working to implement across a wide range of its equipment offerings. With an ultimate goal of 250 cycles per minute, GN turned to long-time supplier Bosch Rexroth Canada for engineering support to size the servo drives, motors, and motion controller.

Working closely with Jacek Katarzynski, GN's Electrical Design/PLC programming manager, Tom Vermeltfoort,

Bosch Rexroth Canada's applications engineering manager, engineered a new concept program to achieve the desired results. "Using past experience with GN's machines, we applied servo modeling to provide optimum sizing for the drives and controllers," explains Vermeltfoort. "Previous engineering models were compared with actual test results, and we then applied similar principles for the stand-up pouch machine to size the servos. This modeling showed that using a gear reducer would allow a smaller motor to be used on the machine than those used on similar machines."

In order to achieve the quicker responses on the drives, the Rexroth team recommended direct drive, low backlash, planetary gearboxes, which, in turn, reduced the motor size and provided a more rigid design with fewer tuning issues.

"At the speed we wanted this machine to perform, if we had used a servo motor with a belt drive, the system would have suffered from elasticity in the belt, resulting in decreased motor performance and difficult tuning," notes Gosling.

As a general statement, traditional equipment runs 90 to 120 cycles per minute based on the complications and sealing times required to produce pouched products. By using multiple hit sealing (typically two hits) with four independent servos, GN was able to reduce the overall sealing time to approximately 100 to 150 microseconds, resulting in a speed of 200 cycles per minute or an increase of 80 percent.

Each of the machine's 11 independent servo systems is individually controlled by a servo drive and a master PPC motion controller that synchronizes all operations, including five sealing motions, two cooling motions, and two web motions followed by one cut-off and one stacking motion. States Gosling: "We wanted state-of-the-art controls on this machine, and the PPC motion controller was the key."

"GN believes 100 percent in independent drive systems," states Gosling. "Although they have a higher initial cost, the payback is quickly achieved due to higher speeds, easier set-up, greater accuracy, and better seal parameter control. For our customers this will mean no lost time, fewer mechanical systems which wear and require maintenance, as the machine matures and will drastically reduce compressed air consumption."

GN has been using Rexroth products for many years, being confident in selecting Rexroth as their motion control supplier of choice. "We sell worldwide and we need support for our products," said Gosling. "GN equipment is 24/7 production machinery, and we simply cannot afford problems in the field."

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