Soft Drink Solutions

SERVO SYSTEM HELPS CREATE MORE EFFICIENT BEVERAGE PALLETIZER

Using Rexroth's IndraDrive M drives and MSK servo motors, T-TEK saw a 15–20 percent improvement in apron and compression cycle times (courtesy of Bosch Rexroth).

With the high demand and consumption of soft drinks, fast production is an obvious challenge for packaging companies. How can a company control energy consumption, soft handling of lighter and thinner packages and palletize a widening range of materials? T-TEK Material Handling, Inc., a specialist in building material handling systems for the beverage industry, recently developed a new model to address these specific issues. With the assistance of Bosch Rexroth and their distributor, FPS Technologies, T-TEK developed a servo system that could increase speed, provide better material handling and use less energy.

"With Rexroth's servo technology, we've significantly reduced the machines' energy consumption," says Brian Traff, vice president of T-TEK. "Although our goal was to improve the performance of our packaging capabilities, the energy savings that accompany this solution is a welcome bonus to our customers."

T-TEK's TS Series three-axis palletizer is designed to handle a variety of packaging configurations of cans or bottles in layers containing as many as 32 packages each. During beverage production, the filled packages move down the packaging line to the palletizer, which handles them at a rate of up to 180 packs per minute. They are then oriented into a specific pattern—each layer is offset from the previous—and the entire accumulation is placed on the pallet. The filled pallets proceed down a conveyor belt for shrink-wrapping and pickup.

During development of the system, T-TEK identified three primary components where speed and energy usage could be improved: apron, compression and hoist. The apron allows each layer to drop cleanly on the pallet, the compressor applies pressure and holds the layer in place and the hoist is responsible for raising and lowering the pallets.

T-TEK immediately turned to Bosch Rexroth's electric drives and controls technology for servo solutions that could improve the speed and energy usage in these areas. By incorporating Rexroth's IndraDrive M drives and MSK servo motors, T-TEK found a solution that allowed the components to move faster but decelerate more smoothly with less jarring. This is crucial not only for extended component life and lower maintenance costs, but because the demand for sustainability in packaging has led to the use of lighter and thinner materials for product packaging.

Since plastic bottles are now produced using half the plastic used two years ago, palletizers are being challenged to handle these cases at higher speeds, but more gently. Control throughout the compression process is vital, with improper handling leading to damage and waste, especially with thinner materials. The TS Series uses the Rexroth servo to maintain a high level of control for even the most delicate packaging.

An immediate benefit from incorporating Rexroth's drives into the TS Series involves the concept of regenerative energy. This is energy created during an application where the load possesses more energy than the motor, which is often the case when lowering heavy pallets. Motors convert electrical power into mechanical power for the machine. However,

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Rexroth's drives brought significant improvements to the TS Series hoist operations (courtesy of Bosch Rexroth).

The TS Series from T-TEK not only performs faster than earlier models, but it uses less energy (courtesy of Bosch Rexroth).

servo motors have the potential to generate electricity, too. Simply put, as the heavy pallet decelerates, the braking motor turns into a generator, converting mechanical power back into electrical power, which needs to be removed. Traditionally, most systems would take this excess energy and burn it off using a brake resistor.

Instead of brake resistors, the palletizer uses Rexroth's MSK motors, IndraDrive M servo drives and HVR power supply to take the extra energy and regenerate it. The advantage is converting usable energy for the machine by powering the other servo motors on the DC voltage bus that may be in acceleration mode, instead of burning off the energy to a resistor.

Prior to using Rexroth's servo components, T-TEK used a 20 hp motor to power the hoist. Rexroth's MSK servo motors produce faster results with only a 10 hp motor that permits better case handling and greater load deceleration control. Rexroth's MSK motors feature intelligent feedbacks, meaning the drive can read each motor for its current, torque and speed capacities, thereby allowing for greater motor control and faster startup. With the small motors and regenerative drive capabilities, this creates additional energy savings.

"The overall energy savings is estimated to be around 20 percent compared to the machine T-TEK built about six months previously," Traff says.

Incorporating these features into the TS Series has led T-TEK to explore other new developments, including the conversion of other motor, hydraulic and pneumatic cylinder applications to servo control.

"We're seeing that the benefits extend well beyond the considerable performance improvement," Traff says. "We are investigating several other applications to implement as servo solutions."

In addition, the engineering support from Rexroth has been instrumental during the development of these new high-speed palletizing systems.

"Rexroth offers good local, as well as solid international support. We have applications in Mexico and Canada, and the Rexroth staff has always been extremely helpful from the design phase through field implementation and follow-up," Traff says. "Rexroth has helped make the TS Series vastly outperform our competitors. Their strong reputation within the packaging industry made them an easy selection."

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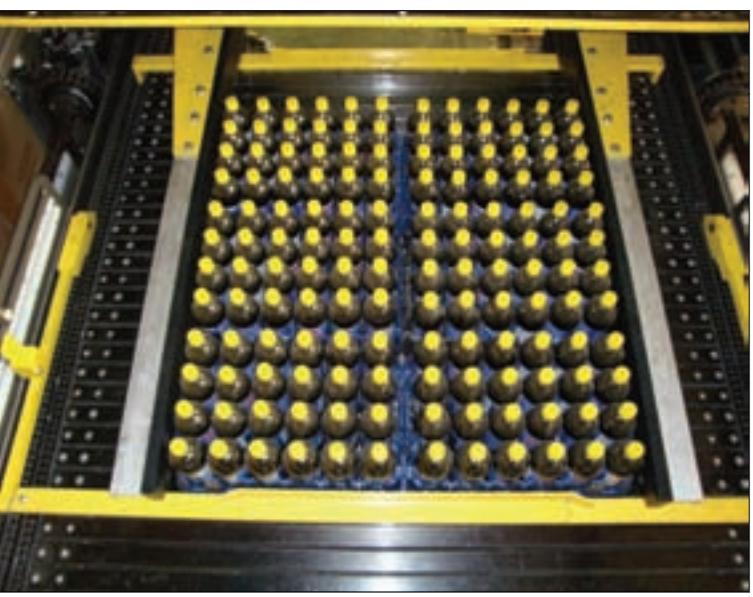
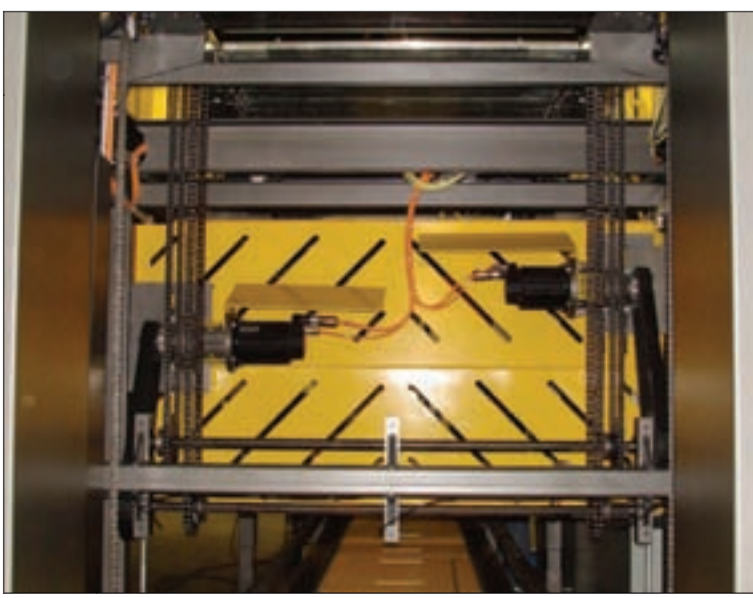


The need for more delicate material handling led T-TEK to develop the TS Series for faster speeds, but more gentle operation (courtesy of Bosch Rexroth).



T-TEK can now produce faster results using smaller Rexroth MSK motors (courtesy of Bosch Rexroth).