High Performance in Packaging

Electronic motion control is a key technology for innovation and optimization in packaging. The packaging machine manufacturer B&B-MAF recently took advantage of this technology for the first time during the implementation of a customer order. Using the Simotion motion control system, the company realized a 21-axis bag filler with a servo compression station within a very short period of time.

The majority of the machines built by B&B-MAF GmbH & Co. KG, based in Hopsten, Germany, are individual adaptations of series machines, geared to the needs of the specific customer. This was also true for the BF 15 bag filler, which a manufacturer of tissue products had ordered.

Complex movements

Because of the complex movements within the machine, B&B-MAF decided to use the Simotion motion control system – specifically, the latest Simotion CPU D445-2 with the current software version (V4.2) and the CX32-2 extension modules.

The following description of the processes within the machine shows how complex the movements are: During grouping, the future contents of the bag are first supported by pairs of servo-guided wire holders. The grouped products are then moved to the also newly developed servo compression station, which presses the excess air from the product bundle so that the products can be pushed into the bag more easily. Thanks to the servo technology, the movement profile of the compression station can be adjusted precisely to the specific product features. In order to maximize throughput, two sets of tacted gate valves handle the majority of the product transport. The movements of the tacted gate valves must constantly be synchronized with those of the servo-guided wire holders. This ensures a continuous process, making the highest throughput rates possible.

Fast packaging

One of the innovations of this machine is the newly developed “waterfall” line. This line ensures that the supplied products are deposited with the right orientation, stacked according to the recipe, and grouped. Depending on the format of the product and the bag, the machine...
is able to package in one or two rows. This means that even in single-row operation and single-ply 3 x 7 bag format, more than 230 paper towel bundles can be packaged per minute.

High project security thanks to simulation

Despite the complex processes, it was possible to implement a simple system structure. This was due to the fact that with Simotion, the motion control CPU also performs PLC tasks; in addition, the auxiliary axes were integrated into the axis groupings realized with Sinamics converters. This way, they are also coupled to the DC link of the motion control system. At the same time, the use of standardized drives, even for the auxiliary axes, results in identical engineering and uniform response of all axes, which in turn makes the complete inspection of the automation simulation much simpler, as Hermann Hugenroth, head of the electrical engineering department at B&B-MAF, points out. The manufacturer made extensive use of the simulation option and verified all movements in the computer prior to implementation. “This saves a lot of time during commissioning and significantly decreases the risk of a crash. The system thus gave us very high project security. Add to that the support that is offered, and the solution is truly outstanding,” summarizes Hugenroth.

Trouble-free commissioning

The Simotion Scout engineering software also offers the developer easy and almost intuitive access to the comprehensive options of the motion control system. “Our developer had no previous knowledge whatsoever. However, the system is set up so simply that after only three days of competent, monitored training, he was able to implement the 21-axis motion control completely on his own,” reports Hugenroth. Thus, commissioning the machine went without a hitch. The manufacturer and customer are pleased with the impressively high performance achieved by this solution. “Since we have implemented this technology, our access to the market has become even better and broader,” explains Hugenroth. “We now have a system with which we can take many of our ideas to market more easily and quickly than before.”

“The motion control system from Siemens gave us very high project security. Add to that the support that is offered, and the solution is truly outstanding.”

Hermann Hugenroth, Head of Electrical Engineering Department, B&B-MAF GmbH & Co. KG