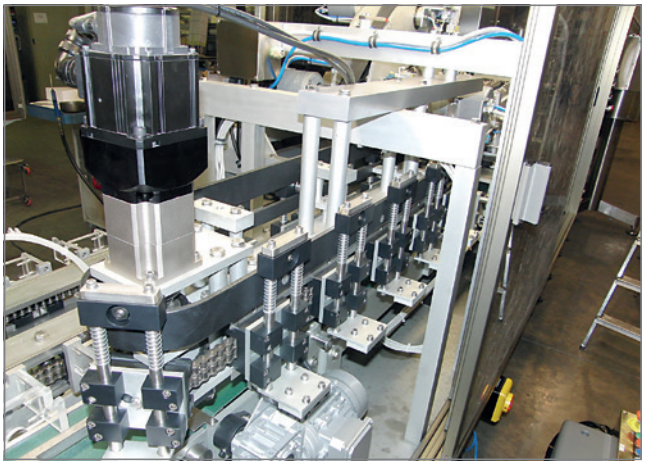
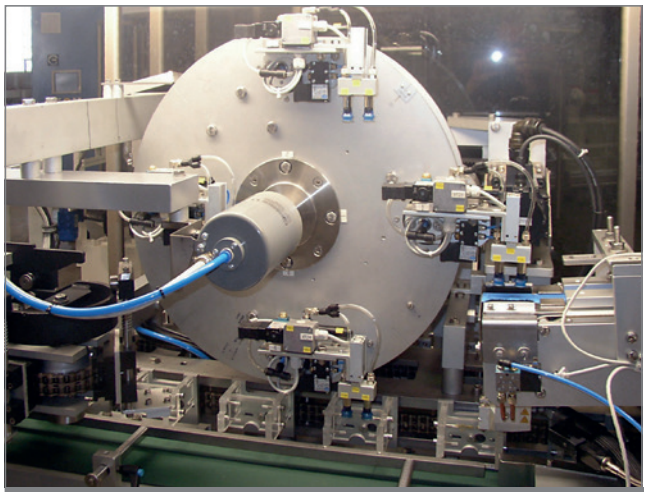
Betti

Packaging line for boxes with polyethylene dispensers





Special unit at the heart of the system responsible for 3 three key functions.

By exploiting the advantages of the Sysmac platform from Omron, Betti Srl has developed a dispenser applicator integrated into its own line for packaging frozen flavorings in specially designed boxes. The entire process takes place in a cold store at the rate of 120 packs per minute.

Creating complex packaging in the food sector can be problematic, especially when the application requires great accuracy and performance in systems operating inside cold stores with very wide temperature ranges.
Orto Verde S.c.a.p.a. is a company in Cesano di Senigallia that produces, processes and packs agricultural products grown according to an integrated production process. The company was looking for an effective and reliable solution for the packaging of its frozen flavorings. They needed a line capable of packaging the product into individual boxes, equipped with dispensers, operating at high speed but, above all, reliably, whilst retaining sealed-in freshness without the usual positioning problems encountered in this kind of application. With the approval of the company's President, Nello Betti, the challenge was taken on by Betti Srl, a company in Faenza with over 50 years' experience in the packaging sector.
Betti developed an innovative system, using a standard box packaging machine as its basic structure, for the application of a dispenser based on the Sysmac platform from Omron.

Easy Opening and Closing

As Matteo Betti, International Sales Manager at Betti Srl, explains: "Inserting a dispenser in a package of frozen goods represents an added value for the frozen food industry and one that enhances the product brand. This aspect makes it possible to maintain the freshness of the product, allowing the Marketing Department to hit the market with a much more attractive offer."
In this particular case, Orto Verde, at the request of a client, needed to purchase a line for packaging frozen flavorings in boxes equipped with a polyethylene dispenser, at a production rate of 120 packs per minute. To achieve this result, Betti took the design of a standard box packaging machine and modified it to requirement by implementing a grab-and-drop system based on Omron technology. At the heart of the system is a special unit that is responsible for three key functions: supplying the dispensers (via feeders with a vibrating base and diverters), placing them on the box by means of hot-melt, zero-gravity guns, and inserting them in the box under pressure, on a continuous cycle.

The quality of the application (in terms of gluing, integrity and positioning) is checked by a vision inspection system and, before that, from the accuracy of the cycle synchronization.
Roberto Scarpelli, Sales Manager for Omron, explains: "We have been concerned about ensuring the reliability of the solution upstream of the process with regard to one objective in particular: to ensure the dispenser is precisely placed on the packaging, both in terms of its position and in terms of any traces of glue inside and outside the gluing area." Betti's efforts were therefore focused on the quality of motion synchronization and especially on the tracking and application of profiles in the electronic cam. From this came the idea to develop the system around the Sysmac platform from Omron — a choice motivated by the excellent qualities of system integration and the possibility of reducing to zero the risk of mechanical damage related to the interaction between the axes.

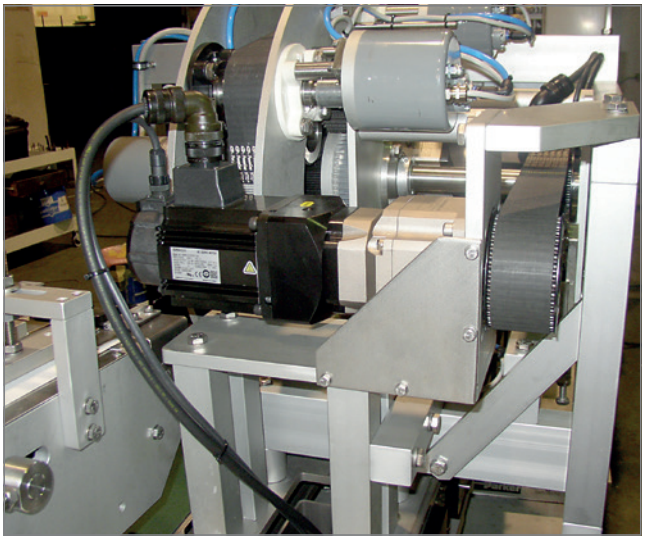
Perfect Synchronization

The five axes of the box packaging machine are controlled by Omron G5 servo systems (with associated gearboxes), which, in this case, are used to control the movement of the main chain conveyor, the cam profile with regard to the insertion of the box in the machine process, the application of the dispenser (two motors working in sync) and the press used in the gluing process (which works through tracking). Everything is coordinated by an NJ controller with 16 axes (with various local and remote SmartSlice I/O devices) and a J1000 inverter. On-site monitoring is carried out by means of an Omron NS8 touchscreen panel: from this, the operator can monitor the status information of individual placements, the manual controls on the axes, as well as all the various notifications about alarms and diagnostics.

The integration between the PLC and motion in a single platform has allowed Betti's technical staff to minimize complexity. Compared with solutions adopted in the past, the advantage has been particularly noticeable in the development phase. "Even without any prior experience, we have incorporated the operation of the system very easily", Danilo Santandrea, Technical-Electronic Manager, and Fausto Gordini at Betti were keen to emphasize. The implementation of the NJ controller is the cornerstone of the system — an element that is able to ensure precision and stability in the system. Betti managers stress that synchronization works perfectly, since the automation platform and the programming platform rule out any collision where interaction between axes comes into play. The qualities of a rapid network like EtherCAT complete the picture, allowing a drastic reduction in wiring: with shunt components and cables removed on each individual axis, Betti managed to significantly reduce dimensions, saving approximately 5% on the costs associated with the design and development of the wiring diagram.

Investment for the Future

The requests made by Orto Verde S.c.a.p.a, and, in particular, those concerning speed and accuracy in positioning the dispenser, were fully satisfied. The box packaging machine, in operation today at Orto Verde plants, is able to operate at the requested speed with a scrap rate of only two per thousand.
Simplifying wiring operations, sizing the system and putting the system into service extremely quickly have provided additional value to the system, allowing Betti to acquire—over and above the order itself—valuable know-how which can be used in the immediate future. Using the experience gained on the Sysmac



Omron NS8 touchscreen

platform, the company can now move on to more complex applications, responding better and more quickly to specifications relating to speed, format changes and cost reduction. A platform like Sysmac improves, in this sense, the company's ability to shape their projects according to the product to be made, and to develop flexible machines that, in many cases, are able to make various types of products using a single application. No less significant in this sense is the possibility of using a highly rational software architecture that allows you to easily program tracking systems, by altering the cam profile as appropriate.

Overall, the investment in Omron architecture has improved the level of integration between mechanics and electronics. Matteo Betti summarizes by saying: "Historically, our strength lies in the integration between different filling systems within individual applications; the market recognizes the great ability we have in the design and manufacture of machines capable of working with different types of boxes. We believe that complexity must remain behind the scenes and that the client should not be aware of the issues that every project brings with it: the client must simply be able to work independently. The PLC and all the other high-tech Omron components are in fact going in this direction, allowing us to integrate the various peculiarities of the application on a single line and to offer the end user - and in particular the operator - a practical solution and, at the same time, a rewarding solution."

SYSMAC
always in control

About Betti

Betti was established in 1955 by Mr. Aurelio Betti, a young and enterprising mechanical engineer anxious to express his creativity on his own account. Initially the firm began manufacturing cartoning machines and other equipment for packaging dry pasta and then went on to cover other sectors too.
In the 1950s and 60s, many automations were invented, often cutting-edge systems today found integrated, ergonomized and made even more appealing in an increasingly more sophisticated technological context.
In the 1970s, the company diversified its production and entered new packaging markets, especially that of chemicals. Skills were extended to cover all products packageable in cartons and cans with vertical filling. Besides a broad range of cartoning machines, packaging lines were built with automatic end-of-line systems which have replaced operators as regards heavier jobs.
Today, Betti machines are well-known and appreciated the world over and the company, now run by the third generation of the Betti family, continues to carry on business traditions, with all the engineers strongly involved in project development and an extremely friendly work environment.
Betti is a solid and stable company, increasingly more determined to take up the technical challenges launched by the market of the new millennium. Such determination makes it possible for customers to approach our company in the knowledge that they will receive all the care and attention which they require.

About Omron

Omron Industrial Automation is a leading manufacturer of high-tech products and solutions for industrial automation. The company is part of the Omron Corporation founded in 1933 in Kyoto, Japan, and employs more than 36,000 people worldwide. The wide product range includes control, drive and safety technology, image processing and sensor systems, as well as control and switching components. The aim is to provide mechanical engineers with demand-driven, integrated automation solutions from a single source. In addition, Omron offers its customers comprehensive application know-how. as well as region-wide on-site service. In Europe alone, Omron has 19 sales offices and operates its own production sites.