

Clever

The Sleever of the Future is Already Here



Clever, a company specializing in machinery for applying heat-shrink sleeves, has developed a solution based on film cutting using electronic cams.

The system is controlled by an Omron NJ-Series Machine Controller and it allows to work continuously with minimal changeover times.

The advent of globalization has led to radical changes in the machine manufacturer hierarchy. The market increasingly tends to reward those that are able to develop highly complex applications.

This is the case with Clever, a company based in Altavilla Vicentina in Italy that specializes in the packaging industry and, in particular, in combination sleeves and shrink tunnels. In its 25 years of industrial experience (in the beverage, food, non-food, cosmetics, pharmaceuticals and detergent sectors), it has become one of the few companies able to deal with any type of production, from the simplest to the most complex.

“Our goal,” explains Silverio Tagliaferro, founder and CEO of the company, “is to wrap products according to customer requirements. Whether it’s a label rather than coordinated promotional packaging, we study all variables for each project, from both a mechanical and electronic point of view.”

From Marketing to Production

Its specialization in heat-shrink sleeves allows Clever offer a concrete solution to the demands of marketing departments that are looking for original and creative solutions to enhance the appeal their products.

“We assist companies starting at the product development stage,” the manager emphasizes. “Today everything revolves around marketing, and, in many cases, it is the consumer who chooses the product, not the other way around, and good packaging can change the fate of a product. In many cases, it’s our job to assist our partners in studying consumer psychology.”

In practice, all of this translates into designing special machines calibrated for all the individual parameters that contribute to the product covering: speed, materials, sleeve orientation, tear, shape, size, sealing, finishing, thermal adhesive and promotional clusters. These factors contribute to increased complexity and the need for automated systems.

As a result, Clever decided to entrust its qualified partner Omron with managing project electronics.

“Omron components, which have been installed in our solutions on a permanent basis for over five years, have contributed in a decisive way to providing us with all of the resources – both hardware and engineering support – that allow us to meet



customer requirements," explains Tagliaferro.

"Omron offers the type of products suited to developing fast machines, or machines that move quickly, while also being extremely reliable. Generally, these functions are very specific, and are difficult, if not impossible, to find in the competition."

Flexibility First

Clever designs and manufactures various types of systems operating at speeds ranging from 3,000 to 50,000 pieces per hour, depending on the type of application.

"The differences depend on the type of project," indicates Tagliaferro, "it is the customer that defines the objectives, thereby determining the technology that will be used and, consequently, the production rate. This has led us to design more and more complex applications: thanks to Omron's support, we can now cover any type of container of any size or material, from bottles for the beverage industry to bottles of detergent."

A typical sleever can cover bottles, tins, flasks, jars, pots, tubs, packages, cans, boxes and other glass or plastic containers with heat-shrink PVC film.

Compared to paper labels, this solution is stylistically more attractive, thanks to coordinated advertising, and is much more geared to consumer tastes.

Generally, the labels are rolled on a reel, cut in stages and applied one by one to the containers, which are then sent into the shrink tunnel.

This is one of the key steps in the process: The machine must ensure that the label is heat-shrunk in a precise fashion and is centered on the container without deforming the print.

Clever therefore opted for a highly flexible machine that can be calibrated according to all the main variables involved: steam temperature, quantity, capacity and positioning.

These parameters can be saved and recalled from the operator panel for different applications.

Systems of this type are usually managed by Omron PLCs (CJ1 or CJ2 Series), to concentrate all key functions within a single CPU. In this way, the customer can check interrupt inputs quickly and increase the speed of the film feed, as well as the label centering precision.

The film feed is controlled by Omron G Series brushless motors, and all operations relating to the film feed from the feed screw, the cut and the equalization of the labels are handled by the inverters. Safety components complete the offer: the Omron G9SB control unit and safety switches on the doors.

Electronic Cutting: An Advantage when Changing Sizes

In order to improve the quality of its offer, both in terms of speed and precision, Clever developed a new generation of sleever that operates using electronic cutting. This is a solution based on the Omron NJ machine controller, which distributes cutting operations over two heads: When the film runs out on one of these, the machine can continue working at half speed on the second head

and then return to full speed after the film has been replaced. Compared to conventional solutions – where cutting is performed by a mechanical cam, which is always synchronous with the bottle feed rate – this architecture also allows the operator to change product and format without increasing production times, simply by setting the pitch of the feed screw and the length of the film.

In particular, the use of a new-generation Omron NJ machine controller was crucial in making these changes quickly and obtaining superior performance both in terms of precision (distance from the reference mark for sleeve application) and speed.

In addition, the sleever in this configuration is somewhat more flexible as the range of applications to be extended: no longer can only a single product be completed per year, but even more than one project can be completed simultaneously. When working at low speeds, it is also possible to work simultaneously with two formats, at an obvious cost advantage.

A Successful Test

A first electronic cutting machine has already been successfully tested by Bolton for packaging bottles of Neutro Roberts liquid soap.

The system was designed to operate in a continuous cycle (without stopping to replace the film) at a speed of approximately 14,000 bottles/hour per head.

Clever and Omron worked together on a configuration that would provide maximum flexibility for product change operations. As a result, operators can modify both the label application phase on the bottles as well as the cutting phase.

Four Omron G5 servo drives (two for each head) operate in line, and then out of phase when cutting on the bottle, with a positioning time (for cutting) of approximately 20 ms and a bandwidth of 2 kHz.

In addition, there are three brushless servo amplifiers to feed the film and apply it to the bottle. Temperature control is handled centrally through the Omron NJ self-tuning functions. Clever was able to use the PID internal learning inside the NJ to adjust the proportional/integral/derivative parameters automatically, according to the working environment. The machine was operating at high efficiency in a very short period of time, said Andrea Parlato, a Clever technician: "Normally, you need entire days to adjust the PID effectively. This type of solution dramatically shortens the time required, by allowing the PID to be adjusted directly in the customer's work environment."