

Zero defects thanks to machine vision: Ricciarelli ensures the perfect closure of spaghetti packaging

Ricciarelli's new horizontal cartoning machine for long pasta utilizes OMRON's vision systems to verify the effective closure of the packaging and perfect OCR/OCV marking. It offers the capability to control all variables from the HMI and integrate production data directly from the enterprise management system.

A global leader in the pasta-packaging sector, Ricciarelli SpA owes much of its success to its ability to tailor solutions to meet the changing needs of the sector's biggest brands. Such expertise is born out of over 150 years of experience in the food industry, but also the skills acquired in developing, implementing and installing complete integrated solutions. Be it packaging machines, case packers, weighing systems or palletization systems,

Ricciarelli can certainly market itself as a one-stop shop for the development of innovative turnkey solutions.

One example of this is its latest horizontal cartoning machine for long pasta, a solution commissioned by a well-known Italian brand that required zero-defect manufacturing for its cartons. Taking on this ambitious challenge, Ricciarelli was supported OMRON, their main machine-vision provider and technical partner for on-site configuration and development.

140 cartons per minute, zero defects

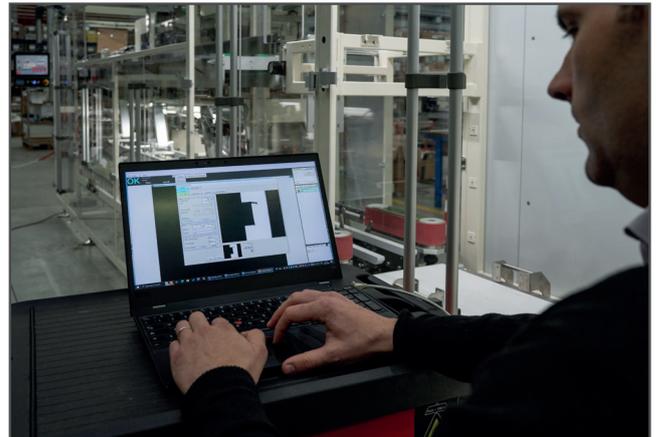
The new solution created by Ricciarelli and OMRON is a horizontal cartoning machine for long pasta in pre-glued and pre-folded cartons that can operate at high speeds



(up to 140 cartons per minute) while guaranteeing perfect closure of the carton. Such a high packaging speed obviously required a high processing capacity, not only because of the amount of data going in but also to manage the variables involved. From the size and color of the packaging to its overall design, the customer required complete control over all sensitive parameters via the HMI (Human Machine Interface) as well as integration with the management software for defining and monitoring production data.

A feasibility study provided a framework for all preliminary development stages, with all potential defects analyzed and categorized in advance. Bench tests were then carried out, taking into account both the time frames involved and any optical issues that arose.

Following these tests, engineers at the two companies focused their efforts on two suitable solutions. The first solution was equipped with two OMRON FHV7 smart cameras with VGA resolution (one on each side of the carton), capable of managing and eliminating parallax errors between the lens and the carton itself. The second—more advanced—solution involved an FH-2050-10 controller, capable of connecting simultaneously with three cameras: two VGA ones and a third high-resolution one for reading batch numbers and expiration dates.



No data lost between packaging and management software

The Ricciarelli cartoning machine has four loading stations: the pasta is fed into the shaped dispensers and transferred to the weighing scales, which prepare the correct amount for insertion into cartons taken from the carton magazine and placed on the conveyor for filling in front of the hoppers. This is where the OMRON vision system comes into play to verify that the carton is perfectly closed. As soon as the flaps have been glued to the marked area, the OMRON vision system checks that the carton is properly closed and accurately marked thanks to OCR/OCV inspection. Specifically, the system carries out the inspection using a vision algorithm that enables the FH system to check the markings with OCR/OCV.

In terms of software, the first task was to integrate the standard FH interface with the machine's HMI to consolidate both the machine control and vision aspects into one single screen. The interface was then customized with the additional controls requested by the customer. From an option to change the date or batch, or the ability to check open/closed flaps, the system allows for these to be configured or parameterized based on user permissions. In practice, this means each user has access to specific functionalities in the system.

Programs can be loaded manually or from the MES as production codes. If the code is not present in the database, the system automatically loads a standard program that is then renamed and configured as a master for production by the external operator.



Machine vision, real results

The work carried out in collaboration with OMRON has allowed Ricciarelli to meet the targets set by the end customer. The main target was to eliminate the risk of imperfect packaging making it to the shelves and damaging the brand's reputation. The advantages of the new solution are also clear for the operators. The OMRON vision system ensures easier operation thanks to built-in advanced diagnostics and greater transparency of potential faults that could lead to malfunctions.

Giovanni Frosini, Area Sales Manager at Ricciarelli, comments on the collaboration: "It was a big challenge for both our companies. The customer asked us not only to double production capacity compared with previous solutions but also to maintain the same level of quality and safety. OMRON supplied us with the components to build

the first three machines very quickly, but above all they provided us with all the expertise and support we needed. It took just six months from order to delivery, so we are very satisfied."

"The outcome has also been truly significant for OMRON," added Riccardo Biagioni, Key Account Manager Food & Commodities at OMRON, "because we approached this as a co-creation project right from the start. Ricciarelli's information and cooperative attitude, combined with our technical and vertical specialization in machine vision, have allowed us to achieve the project objectives."

About Ricciarelli SpA

Ricciarelli SpA offers complete integrated solutions for the packaging of pasta and other food products such as rice, pulses, nuts, snacks and candy. Founded in 1843 by Garibaldo Ricciarelli—first as a mechanical workshop for copper processing and later specializing in the production of pasta dies—the company is a global leader in packaging thanks to a wide range of high-tech weighing-system machines, packaging machines, case packers and palletization systems. Quality is Ricciarelli SpA's top priority. Every machine in the company's packaging line undergoes rigorous quality checks to ensure reliable and long-lasting performance. The company also adopts high standards in terms of materials used and production processes, complying with international regulations and contributing to environmental sustainability. For more information, visit <https://www.ricciarellispa.com/en/>

About OMRON

OMRON Corporation is a world leader in the field of automation, operating in sectors ranging from industrial automation, automotive components, electronics and mechanical components to healthcare, social systems, solutions and services. Founded in 1933, OMRON has around 29,000 employees worldwide, working to provide products and services in more than 120 different countries. OMRON is dedicated to improving the well-being of society by offering technologies that stimulate innovation in areas such as manufacturing, products and customer service. For more information, visit <https://industrial.omron.eu/>