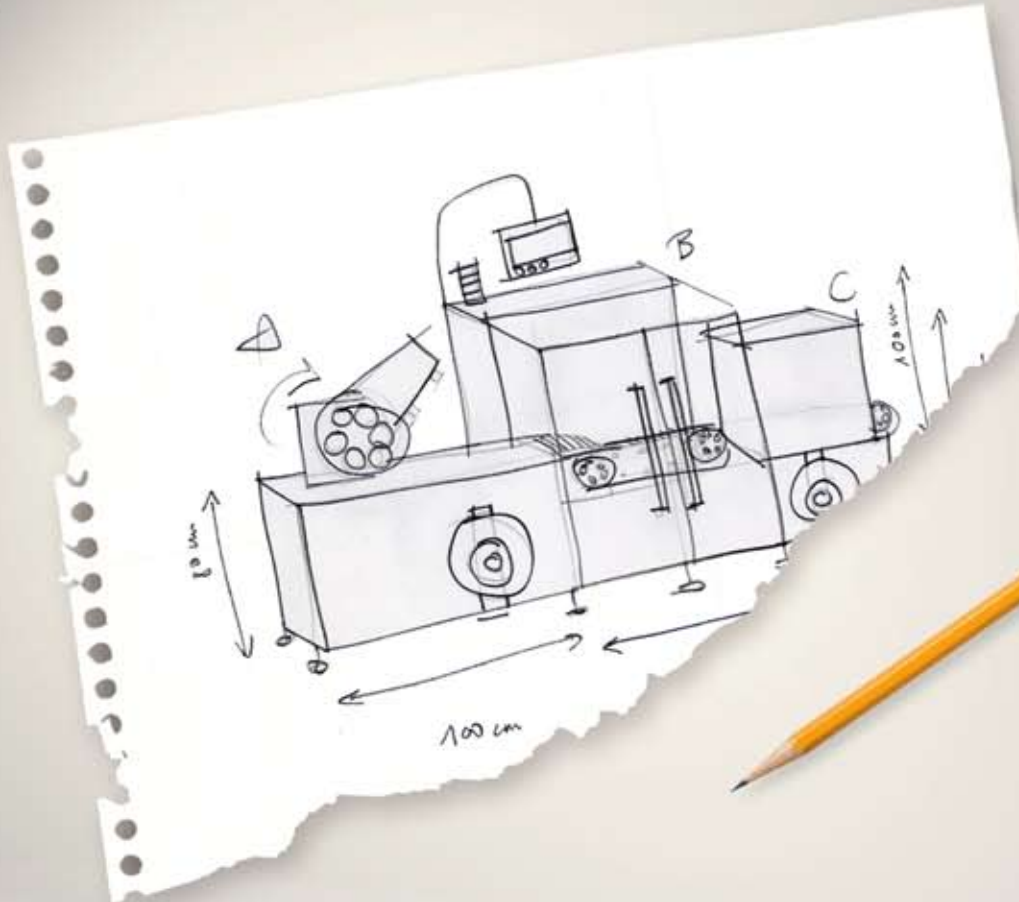


MACHINE AUTOMATION SPECIAL

technology&trends magazine



Turning ideas into machines



Omron's knowledge at your fingertips

Online after sales service and support on a pan European level

More on page 7



Precise synchronisation with Trajexia

Reliable interaction between technology and systems is key

More on page 8



Stand out from the crowd

When we say it works - It works

More on page 4

Move away from the economic crisis, with Scalable Machine Automation

It was about a year ago, when the financial crisis first hit the European economy. Although we are starting to see some small signs of recovery within the market, industry in general and machine builders are still in a very challenging situation. The important question now is: How will industry move away from this economic crisis?

We're not so arrogant as to believe that we can teach you with the "magic recipe" for success, but I am convinced that we can provide you with some of the ingredients. One focus area at Omron is 'innovation'. We are constantly working hard to continuously provide you with the latest products and technologies. For details of our newest product offerings please see our "Product News" magazine. But our most important area of focus, which is explained in more detail within this issue of Technology & Trends, is with our "Scalable Machine Automation" concept. For more than 35 years, Omron has worked with Machine Manufacturers in Europe, and our experience tells us that to overcome this crisis it is necessary to offer a fully scalable set of machine control solutions, which are adaptable for different market requirements, from the most cost effective to the highest in performance and functionality, without compromising on reliability or quality. Omron's focus as an OEM specialist means that we can play a major part in this; we have invested heavily in our people, our products, and in our technical expertise, gaining the experience in order to help our customers implement solutions faster than ever before. Our success will be based on helping you to develop innovative machines that are more flexible and easy to use. We will move on from this crisis to an industry that is leaner and fitter than before.

When we say it works.....it works!

Maurizio Poli – Editor in Chief
General Manager European Marketing



Cover:

Scalable Machine Automation: the right automation architecture for the right machine.

Machine Builders know what they want and have a clear idea about performance/cost ratio. We help them to identify quickly the core automation architecture – the final product selection can be tuned during the process.

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Faouzi Grebici: when we say “it works” - IT WORKS!

Faouzi Grebici is the Divisional General Manager, Motion & Drives, Europe and America. He is responsible for overseeing and implementing many major initiatives in machine automation. Recently he found space in his busy schedule to talk to Technology & Trends about Omron’s Scalable Machine Automation concept and about Omron as an OEM specialist.



Technology & Trends: Can you elaborate on the concept behind “Scalable machine automation”?

Faouzi Grebici: When we reflect on our type of customers we clearly identify that Omron is the ideal automation supplier for OEM’s. Secondly we have identified that the type of machines built fall into 3 main categories: Small, medium and large. When we made a deeper analysis in terms of automation architecture we came to a much rigorous definition:

- **Lean Automation:** One machine/One function. It is aimed at stand alone machinery or functional modules that can fit in a larger machine. Here pricing is very tight and simplicity is paramount.
- **Stream Automation:** One machine/multi functions where the various functions are synchronized to provide a continuous flow. It is flexible, compact and fully transparent architecture. Here speed, flexibility, space and serviceability is key.
- **X-Stream automation:** Multi-machines/Multi-functions. It is dedicated for flexible production cells or lines. It has as core “Stream Automation” with faster controllers and motion networks. It includes robotics, vision systems, machine SCADA and data traceability and storage. Here high throughput with 0% defect and full integration within the factory floor is key.

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Lean Automation

Dedicated for One machine/One function. Simple, compact and easy to use and maintain solution.

- Rugged and robust PLC control
- Up to 4 axis of point-to-point motion
- HMI, servo and inverters included
- Remote access to the controller

Stream Automation

Dedicated for one machine/ Multi-functions. By introducing network connectivity the system can be configured in a highly flexible manner, and provides a single access point to the whole machine.

- Motion bus: Up to 30 axes of motion
- One software for all automation tasks
- Active visualization with smart functionality for device monitoring and configuration.
- Remote access across all the automation layers

X-Stream Automation

Adding control functions including robotics, kinematics, complex vision, data acquisition and storage, provide an ideal platform for integrated solutions for production line automation.

- 64 axis motion control in less than 1 ms
- IPC for visualization and data storage
- SCARA robot and linear motor stages
- 2D and 3D inspection plus fast positioning via Xpectia vision system

TT: So this is not just “creative product packaging”.

FG: Our aim is to offer the right automation architecture for the right machine. OEM’s know what they want and have a clear ideas about performance/cost ratio. We help them identify quickly the core automation architecture. Final products selection can be tuned along the process.

TT: Is this re-enforce the image of Omron as an OEM specialist?

FG: Here we are just saying loud what we do everyday with our customers. Our image of specialist is being built mainly through our activities in front of customers. Products and concepts alone are never enough, it is rather a subtle alchemy of products/solutions, people and an infrastructure geared up to serve OEM segment.

TT: How does Omron alchemy stand out in this crowded market?

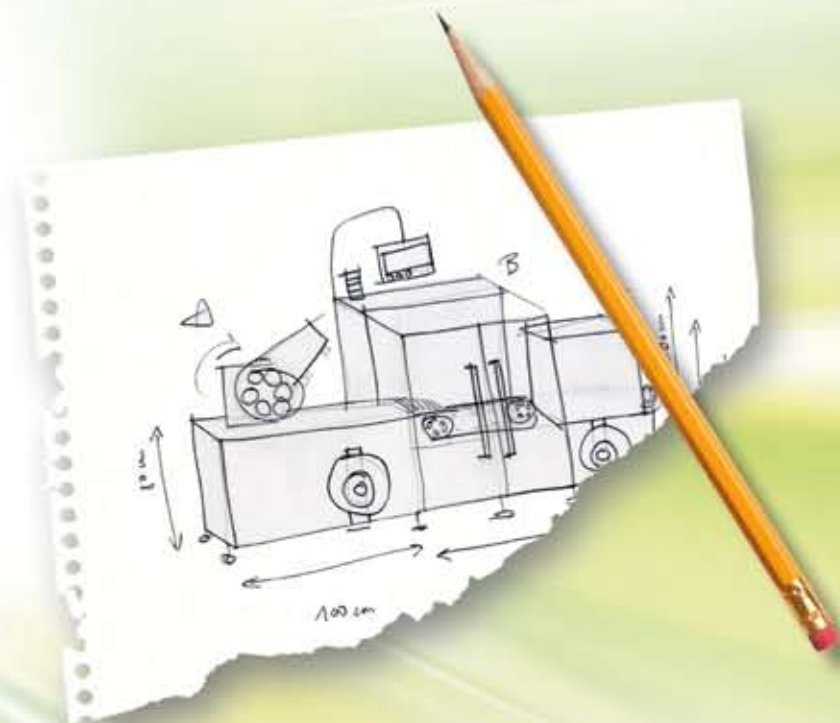
FG: When we say it works it WORKS! The key lies in the establishment of a project team that works with the customer to turn their ideas into machines that work and sell. Sales engineer, application engineers, product specialists and customer service play a major role at every stage of the process. The project team is empowered to take all necessary decisions to close the project! This is Omron.

TT: Any concrete example?

FG: Take the 7 Automation Competence Centers and the 50 technical offices we have across Europe, they are equipped to perform proof of concept in terms of software, networking, motion, safety and quality control. Experienced application engineers and product experts will work with customers to ensure that what we said it works really works.

TT: Machine builders live mostly from export which needs heavy support yet they have to downsize on resources. How can Omron help?

FG: The standard answer would be that Omron is a global automation



player and we are everywhere... but this kind of statement is of no help to OEM’s which are saturated with global and complex schemes that do not work when needed. We are a flat organization and we can communicate freely across countries and continents. We just ensure that wherever the machine is exported we appoint a liaison engineer to smooth commissioning, training and relationship with his end-user.

TT: Your predictions for the business and your final word?

FG: Same for every domain. In time of crisis the mediocre disappear, the average will just survive and the excellent thrive. My final word goes to our OEM customers: With over 50,000 buying machine builders worldwide and near 10,000 in Europe, We are proud and honored to serve a market where hard work, humility and moral responsibility are core values. We thank them for that.



“With myOmron.com we launch into online after-sales technical support on a pan-European level. Our dynamically translated articles makes the accessibility of technical knowledge very easy.”
James Riley - Software Product Marketing Manager



myOmron: Our knowledge at your fingertips

Omron has launched an exciting new online platform designed to give customers direct access to Omron expertise right across the field of industrial automation. myOmron.com is a multi-featured web portal that’s designed to help users with information, support, and interactive advice delivered straight to their desktop.

myKnowledge

One of the two main resources currently available on myOmron.com is myKnowledge. myKnowledge is packed with information about both products and their applications, and includes FAQs, technical notes, white papers, sample designs, and much more. It’s fed directly from the support provided by Omron engineers to customers, and it is extremely easy to search, so that users can get the information they need in the shortest possible time. There’s even a Google Translate tool so that articles can be read in almost any language.

myQuestions

The other main resource available is myQuestions. Users are invited to register on the site to benefit from additional services, such as myQuestions, which allows customers to get specific answers from Omron engineers. myQuestions is fully integrated with myKnowledge, so

the system first looks to see if there are any existing articles that will answer the query. If not, the user can email the Omron engineering team who will come back with an answer. In most cases this will also be incorporated into myKnowledge to extend the database still further. The system automatically sends notifications to registered users when new updates are available.

🔔 Register for myOmron.com for free!

Precise drive synchronisation at high-speed

Improving production speeds are a constant factor in many automation processes. This increased throughput requires reliable interaction between control technology, sensor systems and actuating elements within the packaging plant.

For applications where high-speed production times depend upon precise drive synchronisation, Omron's Trajexia motion controller has proved its suitability on many occasions. Such was the case at LogicPAK in Rödermark, Germany when creating their vertical film sleeving machines.

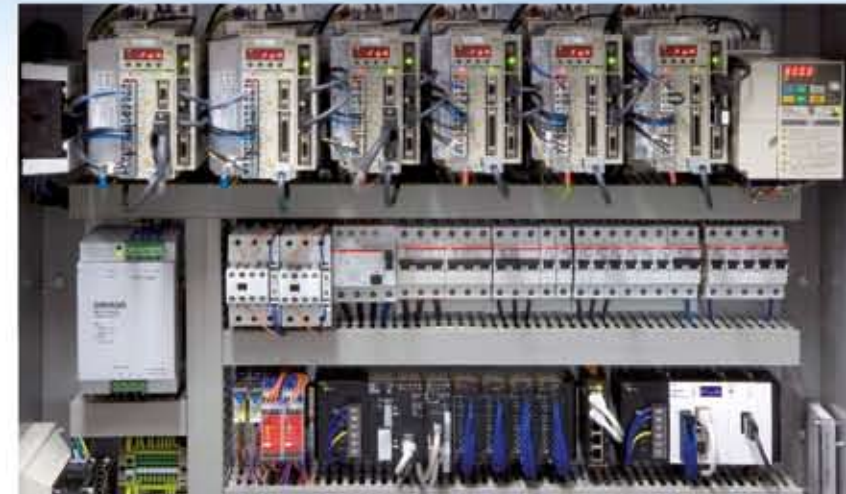
Hand in hand from the outset

Film sleeving machines are used primarily to decorate difficult-to-print types of packaging while also ensuring that the product remains sealed. A printed film is drawn over the package and then shrunk to the size of the pack using hot air or steam. LogicPAK has previously used Omron components, which have proven their reliability, in their horizontal sleeving machines, which are used primarily for packaging products with a small footprint. Due to this prior success, Omron was involved from the start in the development of LogicPAK's vertical sleeving machines. Of course, numerous requirements had to be met for the new equipment, such as handling

a larger range of products, reduced setting times between changeovers, and in addition, the machine had to be smaller than the horizontal sleeving machine and all this had to be developed in just six months.

Decorative and secure packaging

In the sleeving machine, the packages are fed into the machine via a magazine and rotated into the correct position where necessary. The specifically cut film is then placed over the package, the package then continues along the conveyor to the shrinking tunnel, where the film is shrunk to the size of the pack using steam or hot air. The greatest demand placed on the machine, is the synchronisation required of the various axes. Extremely fast production times with a throughput of over 400 containers per minute require precise drive synchronisation to ensure that film and product arrive at the same place at the same time. The Trajexia motion controller is ideal for this purpose.



Up to 10 axes must be synchronised

Depending on the configuration of the machine, between six and ten servo axes need to be synchronised with one another, examples being the main drive for the feed and output conveyor, the aligning device for the sleeve, a camera axis that accompanies the product, and the cutter axis. Optional accessories include a device to rotate the products where their position in relation to the film is important, automatic feeder magazines and a second sleever head where required. Trajexia can control up to 16 axes simultaneously, so in this application it does not even come close to its limits. Thanks to Mechatrolink II, a dedicated motion device bus system, axes can be synchronised with one another in any manner required in just a few milliseconds. In order to achieve this, Trajexia transmits the calculated positions to the connected axes in a fixed 0.5 ms time pattern. The axes then, in turn, feed back their current position in the same time pattern. Any path corrections required can be implemented practically without any loss of time. As well as this, the amount of wiring required during installation is minimal, saving not only time but also valuable installation space. The integrated communication also means that all the axis parameters can be accessed at any time. Due to its modular construction, Trajexia is ideally suited to be adapted to the needs of each individual application. This means users avoid having to pay unnecessary technical overheads. Thanks to its

flexibility, system-independence and ease of use, this scalable, stand-alone, high-performance motion controller is suitable for use wherever decentralised, intelligent servo axes are needed for high-performance systems.

Embedded safety at the core of productivity



All machines, irrespective of purpose, have one characteristic in common – they must be safe throughout their lifecycle. Previously safety was mainly realized by using well tried safety devices that were independent of the automation architecture. However, more recently it's become possible for safety systems to be embedded into the architecture, not only to protect operators but also to support machine performance and productivity. As the diagram shows, different automation architecture needs corresponding safety solutions at their core:

- **Lean Automation:** standalone safety controller and well tried devices
- **Stream Automation:** scalable and programmable safety controller with enhanced diagnostics
- **X-Stream Automation:** programmable safety controller and networked safety system, with full diagnostics and monitoring

📄 Please request your free copy of the Safety Guide via our sales office or Omron representative in your country.



True partnership gives total control across Europe

PLC & Process, Omron's systems integration partner based in southwest France, installed a comprehensive automated system for filling gas cylinders, that's now in use at all the European plants of the Air Products Group. Air Products is a world leader in gas production, with over 22,000 employees in more than 40 countries. One of its most important European facilities is at Saint-Quentin-Fallavier, near Lyon, where gas cylinders are filled with a range of different liquefied products for industrial, medical and specialist applications.

Air Products has an enviable reputation for product quality and exceptional customer service. However, maintaining this reputation in an environment where customers set very tight tolerances for both gas mixes and quantities, and where delivery delays have to be avoided at all costs, is a challenge. In addition, liquefied gas is inherently volatile, and with filling systems working at pressures as high as 380 bar and temperatures of 50 to 60 degrees, safety is a major consideration for both the operators and end users.

The question for Air Products was how to improve delivery in line with customer requirements, while maintaining the highest quality and safety standards within a high-output environment. Previously, the company had used industrial PCs for production management, but these were found to be difficult to control, not particularly reliable and required frequent operator intervention.

Unique open communication protocols

After a comprehensive review of Air Products' production, quality and safety requirements, a fully integrated proposal was developed by PLC & Process. The system they created is based around Omron CJI PLCs on an Ethernet network, which allows completely open and seamless communication, with transparent programming and data transfer.

This open communication is a unique feature of the Omron system, and enables the PLCs to communicate with most third-party devices, such as Air Products' internal PC network through which daily production quantities are determined. At the heart of the Omron system is a

CPU43 programmable controller, and the whole network is managed through an Omron NS12 touch-screen HMI.

The system devised and installed by PLC & Process handles every aspect of the filling and mixing process, ensuring precise mix and quantities. This previously required a high degree of manual intervention: with the Omron system, the process is entirely automated. The PLCs can be accessed remotely through modem or ADSL links, so updates, changes and modifications can be easily made across the whole network. In addition, any technical issues can also be dealt with remotely, which saves time, cuts costs and ensures maximum system uptime.

Complete traceability of medical gases

The system provides the comprehensive data storage needed for complete product traceability. This is essential on every one of the 60,000-plus cylinders delivered in France each year. The site is regularly audited by the French food and drugs administration, which imposes exceptionally stringent standards, and any failure could lead to the loss of this core business.

Each filling zone in the plant has different specifications and pump processes and previously reconfiguration was highly labour-intensive and time consuming. Now, the NS12 touch-screen HMI provides both production data and the facility to change parameters as needed, saving time and ensuring a high level of security and control.

A pan-European solution allowing complete control

The system installed by PLC & Process at Saint-

Quentin-Fallavier has been replicated at all of Air Products' European sites, offering the required combination of precise mixing and comprehensive data storage. Intuitive communication tools maintain complete control, and allow any issues that arise to be dealt with quickly.

Liquefied gas production is an immensely complex business, calling for the highest standards of accuracy, reliability and control. The Omron system enables Air Products to exceed its own high standards, ensuring efficient and reliable production, while maintaining customer satisfaction.

AIR PRODUCTS

PLC & Process



High speed rotation - no sweat! Assembling under motion control

Creating solutions to issues for which there is little or no prior experience is always a challenge, but Omron was able to meet just such a challenge recently working with MST Equipment of Prato, Italy. Put simply, the task was to automate a machine for assembling dosers for stick deodorants. But like many apparently simple tasks, this one was very complicated as it required a process to assemble the five components that make up the doser, including the plastic screw that raises and lowers the stick of material.



The existing system was able to control the amount of deodorant used in each stick but as Stefano Marzini, head of MST Equipment explained, “what was needed was a solution capable of unscrewing and if necessary repositioning the stick. This process could not be performed using a traditional mechanical system: it needed more ‘intelligent’ technology.”

MST Equipment wanted a fully automatic machine to assemble between 13,000 and 15,000 pieces an hour. At its heart a special turntable unit rotates to assemble the five pieces of the deodorant container. It’s driven by 24 Omron Sigma II 650W motors with axial control based on Omron’s Trajexia technology working in parallel on a Mechatrolink network.

Controlled rotation

Trajexia technology enables all 24 motor axes to be controlled via a single encoder, so that the machine can do the same work as 24 mechanical cams. As Stefano Marzini, Head of the company emphasises,

“A real challenge, but one that enabled us to meet the objective in an extremely limited space.”

“What’s special is not so much the use of 24 motors, but the fact that they are remotely controlled within a continuously rotating turntable. Normally, servodrives would be mounted in the panels, but here they sit on the machine and rotate with it.”

This complicated the engineering design of the connectivity needed to communicate with the motors. In addition, there was the need to manage two communication channels which could potentially interfere with each

other. The solution was a 10MB bus passing through a rotating contact, something that Stefano Marzini says was “a real challenge, but one that enabled us to meet the objective of guaranteed communication in an extremely limited space.”

Fully integrated - fully automated

In addition to the Trajexia motion control system, Omron also supplied inverters to drive the turntable, belts and accessories, the power supplies, and a CJ1 series PLC to integrate the inputs and outputs, as well as the Ethernet and a




serial card. The PLC also monitors the operation of the machine. The system is fully automated: only a single operator is needed, and in fact the Ethernet connection allows the machine to be programmed and controlled remotely if needed. The man-machine interface is an Omron NS12 terminal from which all the parameters can be controlled. Compared with previous solutions, this is a completely new assembly system, which in fact enables the elimination of a machine. Stefano Marzini states that the machine is a “technological marvel”, with so many motors being used, and such advanced connectivity. MST and Omron engineers worked together to deliver the entire project in just 11 months from concept to completion. By raising the bar in this way, new possibilities are opened up for the future, especially using the latest generation of Omron solutions such as the 64-axes Trajexia, Sigma-V and Mechatrolink-II networks.

Passionate about quality

Quality matters. But we think that being passionate about quality matters even more: and this passion, this total commitment to quality, underpins everything that we do. Not just in product development and manufacturing, but in systems and support, in delivery and after-sales service, in the speed with which we answer the telephone, and the accuracy with which we fulfil your order.

Our quality assurance system is much more stringent than international norms, and we were one of the first companies in Europe with a multi-site ISO certificate – so you get the same level of quality wherever you or your customers are. And when we work with you, we share our passion for quality, freely passing on all the knowledge and expertise we’ve gained from our own production lines.

We help our customers to build zero-defect manufacturing processes that make product recalls and final inspection routines a thing of the past. Sounds interesting? Come and see us: and find out how a passion for quality can deliver better products, more satisfied customers and reduced costs.

 You can now order the Company Brochure on: www.industrial.omron.eu/companyprofile



A giant step in zero-defect production

Macfer Engineering, based at Sabadell near Barcelona, specialises in the design and manufacture of robotics for automated production lines. Its expertise encompasses a wide range of industries and this broad-based experience has enabled the company to develop innovative solutions, using state-of-the-art technology, such as a recent robotised system for use by manufacturers of paper bags.



Most of the main issues in this sector come at the end of the production process, where the quality of the finished products need to be verified before they are packed and sealed ready for despatch to the customer. Macfer worked with Omron specialists to develop and implement a solution that completely automated this process and overcame all of the difficulties.

The Macfer system uses an Xpectia vision system with three cameras to inspect, verify and control the quality of the finished bags, rejecting those that do not meet the required parameters. Then a robot driven by Omron servos linked through a Mechatrolink II motion-control bus puts the bags in cardboard boxes, which are then closed and sealed automatically. The whole system is controlled from a Dyalox HMI, linked to the vision-system, relays, cameras and servos by an Ethernet connection.

Substantial savings

The Omron vision system provides 100 percent verification of the bags, eliminating claims from the customer

for faulty products. At the same time, the robotised packaging has eliminated the need for manual work. This enables more products to be packed into the boxes, which have been reduced in size by about 20 percent as a result of the new system. This gives substantial savings in labour, materials and delivery costs.

Another advantage is that, by eliminating a series of manual tasks, it has been possible to increase the production speed of the envelope-making machine itself. This is because the manual end-of-line processes, which previously created a bottleneck, are no longer required: the robotised automation system avoids the need for human intervention, so the entire production line is streamlined. Interestingly, the new system has also had the effect of reducing injuries for the operator because of elimination of dangerous

manipulation like manual filling, sealing and handling of the boxes.

Zero-defect deliveries

Improved manufacturing quality has resulted in consistent and zero-defect deliveries, and this in turn is building customer trust and loyalty. Moreover, because production and logistics costs are substantially reduced, the products can be more competitively priced – something which customers always appreciate.

By applying advanced Omron technology to a long-standing production issue, Macfer has developed a solution that represents a significant step forward in the sector. As a result, it will enable manufacturers to optimise their financial, technical, human and environmental resources.

“The new system has had the effect of increasing safety for the operator.”



Automatic sleeving solves a major packaging headache



Food packs with card sleeves are high in demand by major retailers, but they present a challenge for the packaging industry, because applying the sleeves is usually a manual process that's highly labour-intensive. To address this issue, Keymac Packaging Systems – a new UK company whose staff are experienced in the packaging industry – has developed a versatile and affordable automatic pack sleever.

The idea is simple: a conveyor feeds in a tray pack, and a flat sleeve is dispensed from a hopper. The sleeve is formed, the tray is pushed into it and the finished pack is ejected. In practice, it's rather more challenging, because the machine has to cope with oval, round and rectangular packs in a variety of sizes, and it must be capable of accepting the packs continuously or at random intervals. It must also be compatible with full sleeves, band sleeves and narrow "watchstrap" sleeves – and it must have a high enough capacity to match the output of a typical food production line.

At the heart of meeting those needs would be a highly sophisticated motion control system. After evaluating many of the more complex and expensive solutions on the market, Keymac's engineers settled on Omron's new Trajexia motion control system.

"Technically, the Trajexia controller was exactly what we needed," says Mike Bradley, Keymac's Managing Director, "and it is also very competitively priced." In the new Keymac Autosleeve K101, the Trajexia system controls three servo axes: two for positioning the trays – to cater for the different sizes and shapes – and a third for pushing the pack into the formed sleeve.

The motion controller provides exact synchronisation between the axes as well as consistent and accurate positioning of packs in the sleeves. Trajexia controllers have up to 16 digital inputs and eight digital outputs, each assignable by the user: this eliminates the need for a separate PLC. As well as the Trajexia system, the Keymac Autosleeve K101 uses Omron variable speed drives for the conveyors, and a colour touch-screen terminal providing a wide range of production data and control facilities.

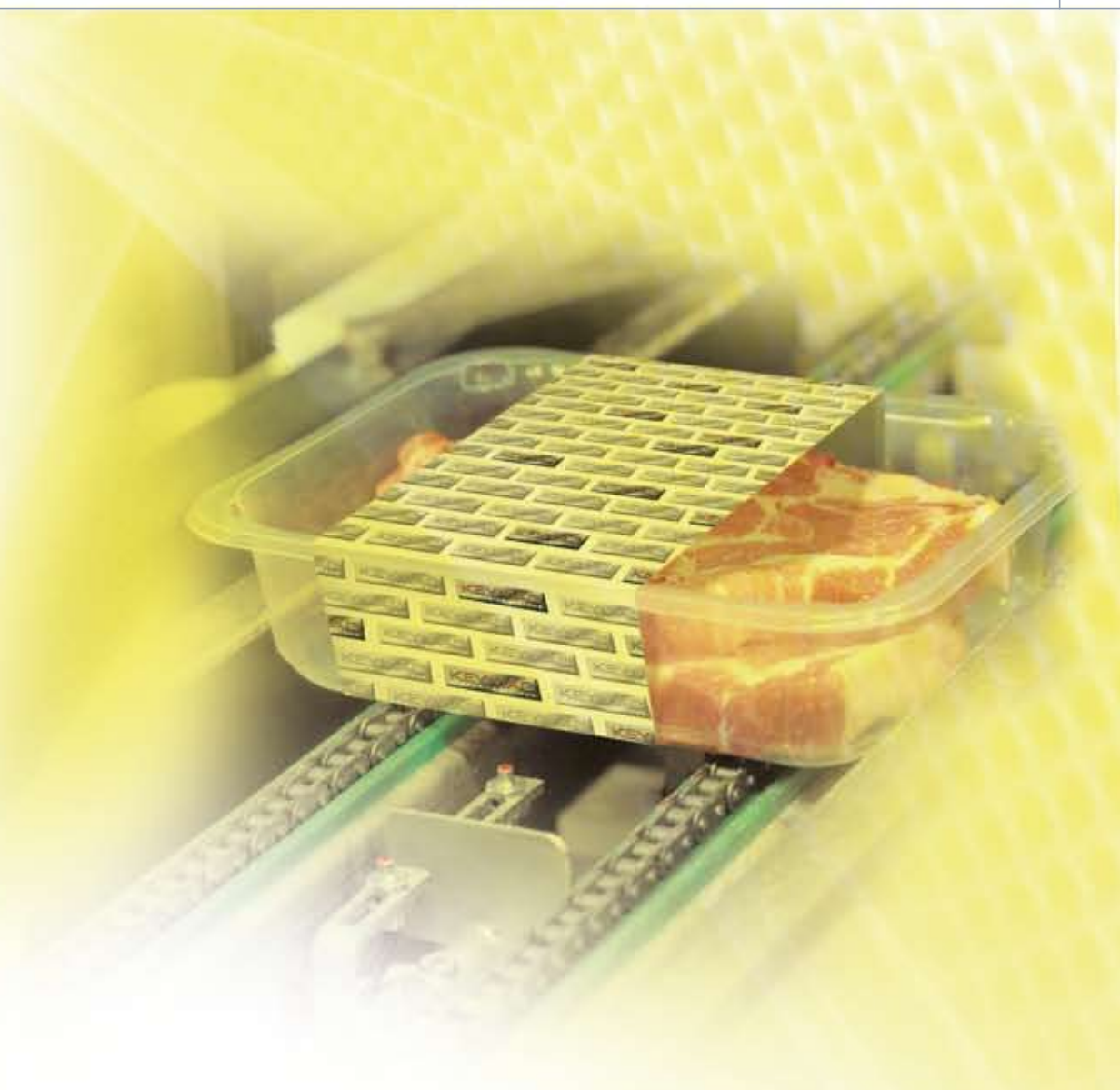
The servo drives, inverters and motion controller are all linked by an Omron Mechatrolink II network, providing dependable high-speed communication. The Trajexia

controller also offers Ethernet support which Keymac plans to use for online remote diagnostics on future machines.

"The Omron equipment and, in particular the Trajexia controller, has played a big part in helping us to achieve our objectives," said Mike Bradley. "Implementation was straightforward, since all the complex functions are already built into the controller," he continued. "We did call on Omron for some technical support, which was freely provided and addressed the issues we had quickly and expertly."

The first of the Keymac Autosleeve K101 machines are now in service, and are consistently achieving throughput rates of 60 packs per minute, compared with typical manual rates of around 40 packs per minute. That's good news for both the packaging industry and for Keymac: as Mike

Bradley says "Our new machine is generating a lot of interest in the food industry, where potential users are quick to understand the big cost savings it can offer."

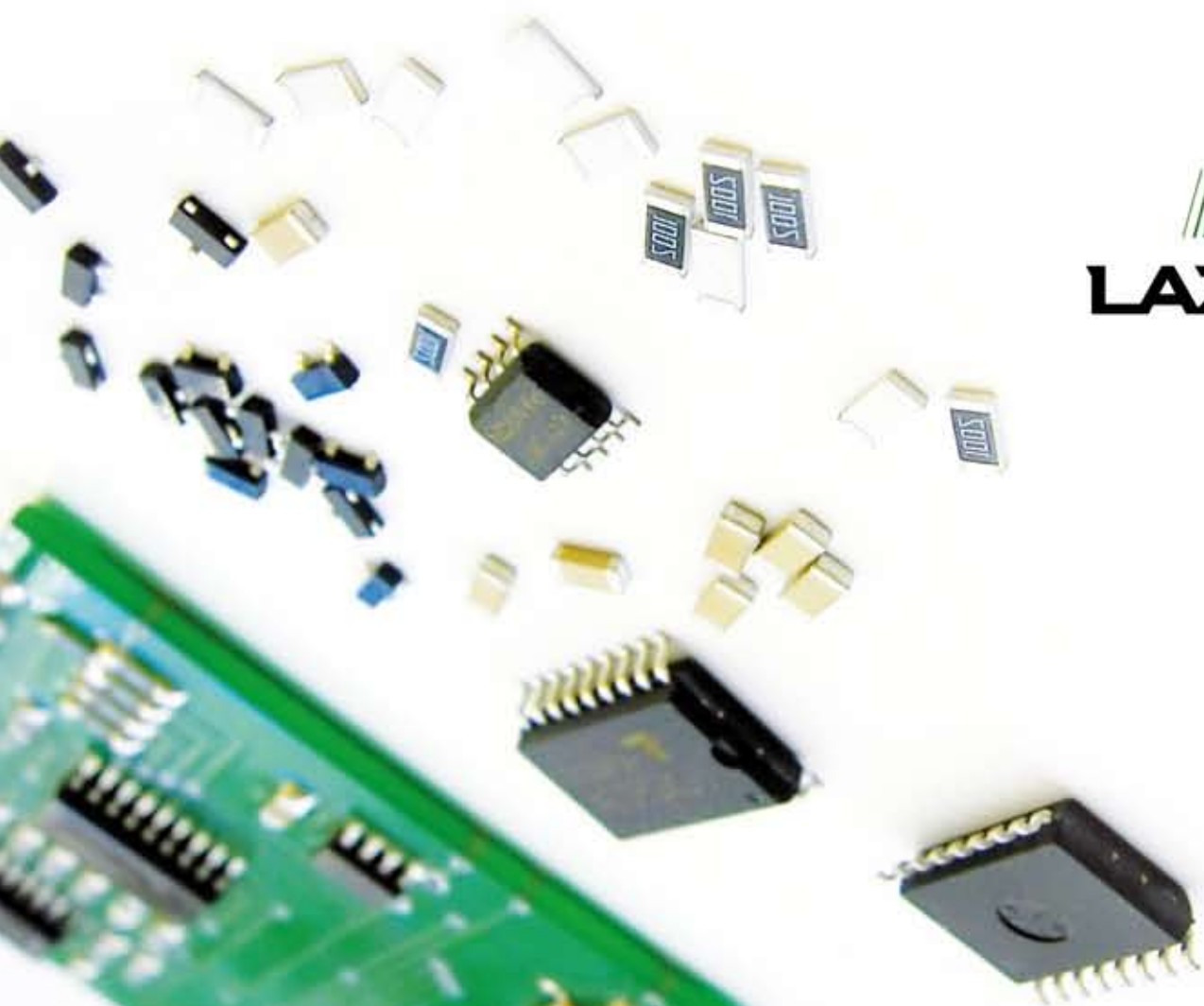




Spanish machine-maker José Lazpiur SA develops automated solutions for assembly-line processes.

The company works mainly in the automotive industry, but has extensive experience in a diverse range of other sectors, including refrigeration, construction, electronics and mechanical engineering. It has established an enviable reputation for its ability to adapt the design of machines to meet customer requirements, working in collaboration with suppliers like Omron, whose products are widely used in Lazpiur systems.

Prize-winning speed, precision and quality




LAZPIUR

The company was recently awarded the prize for the Most Innovative Communication at the XVII Machine Tools and Manufacturing Technology Congress in Donostia. The award was for work in collaboration with the Tekniker-IK4 Eibar Technology Centre, on a machine for inserting components into printed circuit boards (PCBs).

More output, improved precision

Lazpiur's objective was to create a machine that delivers more output in less time while simultaneously improving precision and thus the quality of the finished product. This reduces rejection rates, cuts costs and enhances customer satisfaction. These objectives were achieved by a solution that uses Omron linear motors. The PCBs are fed into the machine on pallets, which are positioned on a rotating table under the component-insertion headstock. The table is moved by the linear motors, so that the headstock can feed, cut and insert the components. The use of linear motors enables this positioning to happen at higher speeds and acceleration, because there is no contact between the fixed and moving parts of the motor. The previous generation of machines used standard rotary motors driving ball screws, but the Omron linear motors allow direct X-Y drive for more power and acceleration, as well as greater precision, to increase productivity

and reduce wastage. All of the linear motors are integrated through a Mechatrolink network and operated by an Omron MCH MCH-71 motion control unit. Most significantly, an Omron CJ1M-CPU13ETH PLC provides fast, flexible and versatile control.

Faster positioning speeds and fewer errors

Physical modifications were needed to the machine, because working at a higher speed and acceleration imposes a greater load than previously. In addition, a thermal analysis was carried out to achieve a design that would dissipate the heat generated by the motors, which might have caused a loss of precision. Pneumatic technology is used on the headstocks to improve insertion speeds and control, which also increases tool-lifespan as well as reducing rejection rates. The company believes that the new machine increases productivity by more than 200 per cent, with positioning speeds as much as ten times faster, and positioning errors reduced by a third. Overall, rejection rates are substantially reduced, while improved machine reliability has increased uptime and availability. A prize-winner indeed.





OMRON

Machine Automation Competence

Helping to build better machines

We work continuously to bring you the latest thinking in machine automation technology, enabling you to operate more quickly, more efficiently and more smartly than your competitors.

Our business is machine automation

Nobody understands your business as intimately as you do: that's why we will not tell you what you should or shouldn't do. But we like to match our specialist resource in sensing, motion and control automation technology, to help you develop better machines: machines that are well priced, functionally innovative, produced with zero defects – with complete reliability. Machines that deliver those benefits to your customer and thus increase your competitiveness.

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