

Finished seals in less than 10 seconds:

Robotics Integrated Controller ensures harmonious control of robots, logic, motion, safety and user interface

Trelleborg Livorno has updated a robotic cell for the finishing of polyurethane gaskets for the sustainable wind energy market. The cornerstone of the solution is OMRON's Robotics Integrated Controller that ensures integration and synchronization of all automation components.

Trelleborg is a Swedish multinational that operates throughout the world. It is a global leader in engineered polymer solutions that seal and protect critical applications in demanding environments. Trelleborg Sealing Solutions (TSS) in Livorno, Italy - a centre of excellence for the company - specialises in the production of seals that are installed on pneumatic and hydraulic cylinders in different market segments - particularly fluid power, agriculture, automotive and energy.

Trelleborg's new robotic cell handles the finishing of polyurethane gaskets intended for the braking systems of wind turbines. The solution, conceived around OMRON's Robotics Integrated Controller, has improved quality and productivity while meeting the growing demand.

Goal: Reducing cycle time while ensuring quality

From the outset, the main aim of the new robotic cell at Trelleborg was to reduce the finishing times of the gaskets and improve the overall flexibility of the process so that new orders could be met more rapidly and effectively.

David Caluri, who is responsible for Machinery and Energy Excellence at Trelleborg Livorno, explains: "At maximum capacity, our existing machine could only achieve a cycle time of 17 seconds for each seal processed. Our goal was



The new robotic cell at Trelleborg has reduced finishing times and improved the overall flexibility of the process.

very ambitious: to dramatically reduce these times so that we could respond more quickly to customer needs, especially when faced by seasonal peaks in demand.”

The new solution is based around two OMRON Viper 650 articulated, anthropomorphic robots. One robot for pick and place and the other for cutting and finishing. These are designed specifically for machining, assembly, and material handling processes. They can work at high speeds and in a totally synchronised way, managed by the OMRON NJ501-R Robotics Integrated Controller.

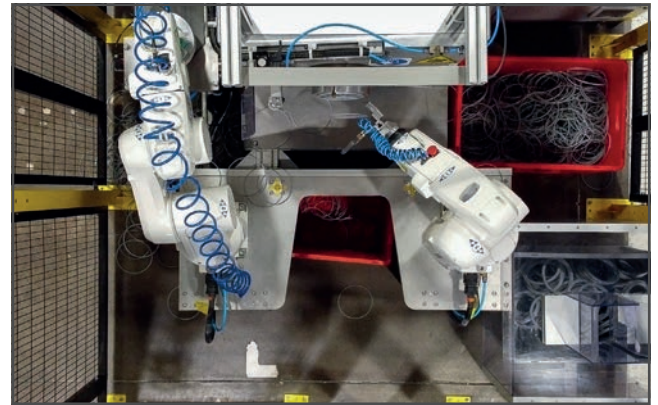
With the new system, the pick-and-place robot receives the seals from a feeding system, picks them up and inserts them into a rotating spindle on the machine. The cutting robot then makes two cuts along the circumference of the seal – an inner and outer cut. This robot also has a picking tool, with a pneumatic gripper that picks up the newly processed piece and places the finished seal in a basket.

“Beyond speed, the industry is also increasingly demanding in terms of cutting specifications”, comments Caluri: “A clean edge is fundamental in hydraulic applications to guarantee the seal. The tolerances are very narrow and difficult to achieve at high speeds. With this application we were able to achieve even tighter and even more precise tolerances.”

A single platform for all devices

The Robotic Integrated Controller has enabled the company to integrate all the various devices in the robotic cell via EtherCAT and Ethernet/IP. These include the two robots, the human-machine interface (HMI OMRON NA5), the safety aspects using an OMRON NX-SL3300 safety controller and distributed NX-S modules, the pneumatics, and the logic and motion elements.

David Caluri explains: “The programming part was very easy, because OMRON offers a single platform for all of the components that are used on this application. With the Sysmac Studio we were able to programme all of the different elements from a single solution - the inputs, outputs, safety, HMI and robotics. We can have an instant view of the individual components, even when searching for faults. Having total control of the automation allows us to be flexible in our activities and also gives us a big advantage in terms of training: with an all-in-one solution, it’s easier to keep all the staff up to date.”



The Robotics Integrated Controller from OMRON ensures harmonious control of robots, logic, motion, safety and user interface.



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Caluri comments: “In the field, everything is managed through recipes. When we find the right set-up for the product that needs to be processed, we give it a name and a code, which is saved so that it can be recalled at any time. This flexibility provides the company with a host of benefits. In the past, Trelleborg had to go through complex manual set-ups. Today, it can change the set-up several times a day, for instance, altering the cutting angle or addressing requests for new customised formats without the need for long and complex retooling operations. We know the functionality inside out.”

Cycle times reduced by 80%, higher productivity and a quicker ROI

When fully operational, the new robotic cell for finishing the seals can process a piece every 9.5 seconds, reducing cycle times by about 80%. This has enabled Trelleborg to improve the overall productivity of the process by some 20%.

“The new cell meets Trelleborg’s need to improve the procurement of gaskets stocks at the various logistics centres in Europe, Asia and America, and the company is able to support its customers if there’s an increase in instant demand”, comments Leonardo Ceccarini, Operations Manager Trelleborg Livorno, estimating that there will be a return on investment for the new system of about two years - a 30% improvement when compared with previous solutions.

“The collaboration with OMRON’s technical staff proved to be fundamental in overcoming all the unknowns of an

application that, as the first of its kind in Europe, used the Robotics Integrated Controller for the management of all the automation components”, Ceccarini concludes.

“Trelleborg has allowed us to bring our state-of-the-art technology to the field,” says Enrico Naviganti, OMRON’s Area Sales Manager. “This application included a need to maintain high quality standards while achieving much higher speeds compared to those obtained previously. Our technology enabled the company to meet all of these KPIs in the experimental phase.”



Trelleborg Livorno

About Trelleborg Livorno

Trelleborg Sealing Solutions (TSS) is a leading provider of sealing solutions worldwide. Its product range includes O-Rings, hydraulic seals, rotary seals, oil seals, static seals, pneumatic seals, mechanical face seals and many more. In the Italian plant in Livorno, the company produces a complete range of polyurethane seals, from the versatile O-Rings to more complex, customised geometries. Over the past 50 years, the company has developed a range of seals and bushings designed to meet the most extreme needs of the industrial sector. For more details, visit <https://www.trelleborg.com/en/seals>

About OMRON Corporation

OMRON Corporation is a global leader in the field of automation, based on its core technology of ‘Sensing & Control + Think’. OMRON’s business fields cover a broad spectrum, ranging from industrial automation and electronic components to social infrastructure systems, healthcare, and environmental solutions. Established in 1933, OMRON has over 30,000 employees worldwide, working to provide products and services in 120 countries and regions. In the field of industrial automation, OMRON supports manufacturing innovation by providing advanced automation technologies and products, as well as through extensive customer support, in order to help create a better society. For more information, visit OMRON’s website at: industrial.omron.eu.