

New-Motion

Driving innovation:
Developing a gantry robot-palletiser

The Dutch New-Motion, based in Middelburg, has been around since 2004, specialising in conveyor and handling systems for the food and beverages industry. Their mainly stainless steel transporting systems are used by manufacturers of dry-foods, who distribute their packaged products in boxes, bags or buckets.

Thanks to a rigorous standardisation across the industry, New-Motion has been able to efficiently produce standardised modules with a limited amount of parts. These modules form the basis of their solutions. Standardisation has led to interesting and intensive partnership with preferred suppliers.

Challenges in the Market

Initially New-Motion built client-specific transport solutions for all phases of the production process that were technically complex or had non-standard sizes. These last years however, have seen a gradual shift to end-of-line systems for packaging and logistics.

Only producing internal transporting systems with or without smart add-ons was clear to New-Motion would limit growth opportunities. 'We began to focus on additional systems', Ruben Remijn, Sales Manager explains. 'Coincidentally a client asked if we could build a palletiser because he was dissatisfied with his current machine. A mini research indicated that there appeared to be far more complaints about existing palletisers and robots. Seeing as though palletising is logically the final step of our internal transporting systems and that automatically piling boxes onto pallets isn't very complicated, we decided to develop a new type of palletiser.'

Omron Solution

New-Motion has developed and built a new palletiser. The counter has registered over 900 thousand movements. Having virtually piled a million boxes onto a pallet, the faultless longevity test is considered successful. The new machine is an important range extension of the internal transporting solutions that New-Motion mainly builds for the food and beverages industry. The palletiser operating system and control interface were provided by Omron.

'We were in contact with various driver distributors, but controlling the grab-arm with a direct drive seemed to pose a problem, because most providers only sold fixed servo and driver combinations', says Ronald Dekker, responsible for Engineering at New-Motion. 'Omron and Edwin Denissen, Denissen Engineering, both possess enormous technical expertise. Incorporating the Omron's linear servo drive and a 3rd party direct drive motor wouldn't be a problem. Naturally Omron was also able to deliver the other components like the PLC's and servomotors.'



'Of particular added value was the Omron NA graphic control interface', Dekker adds. 'The HD screen quality is fantastic and the operation is very simple. Operators can watch instructional videos directly on the monitor and the interface works with clear pictograms. We were able to programme all sorts of wizards for i.e. pallet selection and pallet load, thanks to this screen intelligence. An operator can define and save their own piling pattern. The system is programmed using the Sysmac Automation Platform, Omron's new platform for integral development and system programming, including interface, PLC's and servo drivers. The project could be completed in 6 weeks thanks to this integrated development environment.'

A surprising concept has been developed

Boxes are delivered to the new portal robot-palletiser on conveyor belts, where a telescopic arm with a grabbing head places them layer-by-layer on a pallet. Three Omron servomotors drive the robot-arm. One on the arm for moving it up and down, the other two on the drive-belts for the single-belt gantry/H-bridge; which ensures that the grab-arm can be manoeuvred into any position with high-precision. The H-bridges flat-lying drive mechanism is unique.

Depending on the product, the drive arm can be equipped with vacuum-, clamp- or sack-grabbers. The fast-coupling and plug connectors ensure that these grabbers are simple to change. The arm is able to make rotating movements with the help of a direct drive servomotor. This direct drive operation ensures that there are no oil or grease spillages on the product, making the grab-arm energy efficient as well.

An important part of the grab-arm is the built-in load cell. This can not only detect anomalies, it also plays a control role in determining the weight of the contents. A box can cause piling problems if it is only half full or is somehow losing its contents.

The New-Motion palletiser can be remotely maintained via an Ethernet router. An interesting feature which allows service mechanics, based in Middelburg to access the palletiser software so that they can quickly resolve problems. The robot can be kitted-out with a webcam, also offering additional assistance and help to users. Mechanical issues of course will mean that mechanics will need to physically determine on location what the problem is, but based on the longevity test success, this should be kept to a minimum. The installation has run completely free of bugs. In addition no signs of wear or problems with the cabling, drivers or mechanical and electrical components has been observed.

Providing advice and technical support Omron helped facilitate the development and build of the new palletiser. It has defined a number of new target-markets for the new type of PLC, food and beverages being one of them. By partnering with innovative machine builders Omron hopes to quickly gain a leading presence in that segment.

Benefits

The palletiser capacity is 200 – 1000 boxes per hour. Box measurements can vary from 100 x 100 x 100 mm all the way up to 600 x 400 x 400 mm, up to a weight of 20 kg. Palletisers with multiple pallet placement options and different packaging supply and discharge possibilities are also available. Extra sheet drawers and an LED display to be able to see the machine status from a



Image 2 Omron's NA graphic control interface



Image 3 Robot drive arm equipped with vacuum grabbers

distance are optionally available too.

Dekker and Remijn estimate the palletiser market chances to be high. New-Motion hopes to sell around 25 of them per year. Portal robot-palletisers have a few important advantages over palletisers that employ robotic arms. According to Remijn the biggest advantage is how little space it takes up: 'because the grab-arm is situated over the pallet, you only need half the square metres. This is especially interesting to companies that want to expand their existing location. This is partially also the reason why the control panels have been placed atop of the machine. In many cases a robotic arm will need a reinforced foundation because of its weight and the abrupt motions. One possible disadvantage of our palletiser is the required height. But, thanks to the telescopic grab-arm, we've managed to minimise this'.

Dekker adds, 'We can build the entire palletiser in our own workshop. This enables us to test every detail of the installation so as to ensure that it works perfectly. This way when we deliver it to the client, the final installation and set up only takes two days. Our palletiser is considerably cheaper than a robotic arm palletiser. Our approach can save tens of thousands of Euro's. Not only that, but I know that many robotic arms are built with second-hand parts. That marginalises the price a little, but the question is whether this detracts from reliability or that maintenance-friendliness don't get jeopardised in the long run'.

Future

Dekker predicts that performance in terms of capacity will be roughly the same. The difference, he is convinced, will be that the energy costs of the portal robot will be lower. New-Motion wants to make the palletisers even lighter and quieter. They are considering to reduce break-resistance, which will also lower energy consumption a bit more, further lowering operational costs.



Image 4 The entire palletiser is built in New Motion's own workshop

About New Motion

New-Motion design, construct and install a wide range conveying systems. For example; Belt conveyors, Modular plastic belt conveyors and conveyor bends. They turn requirements of customers into an efficient and effective conveying solution. In the main, they use standard, modular conveyors, but also deliver custom made units.

Through their experience, knowledge and innovation, they have developed a wide range of conveying systems for various applications in the food, industrial, fulfillment, transportation and other industries where efficient internal logistics are important.

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.