Industries worldwide are looking at industry 4.0 as the future of automated, flexible and efficient manufacturing. Commonly referred to as the fourth industrial revolution, industry 4.0 is, in fact, an evolution of how we use existing technology. Yet it will impact the entire manufacturing supply chain – particularly packaging.

Industry 4.0 is a response to changing consumer behaviour. More so than ever before, consumers demand higher levels of responsiveness, mass customisation and immediate product availability. This, in turn, puts ever-increasing pressure on inventory. Coupled with the rise of e-commerce and increasing global competition, this creates a demand for more intelligent packaging solutions.

**Production on demand**

The basis of industry 4.0 is about utilising the full potential of currently available technology. Among many other opportunities, industry 4.0 will enable automated production on demand, higher flexibility of packaging machinery, with seamless changeovers, and enhanced track and trace of product lines. The overall objective of the packaging industry is to realise these and other benefits while reducing the total cost of ownership (TCO) and increasing overall equipment efficiency (OEE).

In order to comply with industry 4.0, smart packaging lines will need an integrated component and control platform for detailed capture, analysis and cloud-based exchange of data. The data is generated by smart sensors integrated into packaging machinery components, which is analysed and shared by the control platform. Besides connecting packaging machines in line, machinery can also be connected from component to supplier and consumer to production – provided a secure data connection is in place.

**Digital twin**

More detailed data collection enables precise monitoring of the condition of equipment and control of the packaging process. This could increase performance and reliability, through predictive maintenance and detailed adjustments using artificial intelligence. Self-learning control systems can now store and monitor a huge number of variable parameters related to the product, materials and manufacturing environment.
Using this data cloud a digital twin can be created, a virtual copy of the actual machines and production line. This would enable virtual testing of many different settings and parameters in augmented reality and test changes before going live in a factory setting – helping to prevent faults and increase uptime. A digital twin can also be used for training of service engineers and to familiarise customers with their new packaging machinery even before delivery.

**Robotic technology**

E-commerce warehouse distribution is one of the sectors that, due to changing customer demand, could benefit from packaging on demand and inventory reduction. Mpac Langen’s Cartoner 4.0 concept is a robotic cartoner that provides efficient and cost-effective packaging without the need for changeovers or adjustments. The current prototype can pack up to 20 cartons per minute and handle a multitude of different products and cartons on demand.

The Cartoner 4.0 concept uses two collaborative, vision-system-equipped FANUC robots. It recognises when a product is present – triggering one robot to pick up the corresponding carton and erect it and the second robot to pick up the product, load it into the carton and seal it. The Cartoner 4.0 is a highly flexible, small footprint solution that can be integrated seamlessly and safely alongside existing human workers.

**Advanced HMI**

To be prepared for the possibilities industry 4.0 has to offer, Mpac Langen has fitted its packaging machinery with its newly developed Human Machine Interface (HMI). It enables features such as condition monitoring, predictive maintenance, video instructions, remote troubleshooting and assistance, and user access to electrical schemes and machine manuals. Our advanced HMI is a platform for future developments to be introduced step by step according to our customers’ needs.

To find out how we can help you realise the benefits of industry 4.0 please contact Mpac Langen.