Fast, fully automated adjustment to different packaging formats with smart positioning systems

Fig. 1: Gerhard Schubert GmbH wants to guarantee a consistently high level of packaging quality and one of the best ways to achieve this is through standardisation of workflows in machines.

Fast and flexible format changeovers are vital for maximising the efficiency of automated packaging lines. Gerhard Schubert GmbH is a market leader in top-loading packaging machines (TLM) and therefore decided to invest in positioning systems (PSE) from halstrup-walcher GmbH to switch between package formats. Positioning systems use intelligent control system technologies to adjust the various axles of a machine to the packaging format specified for the product. This saves time, reduces the number of rejects, prevents machinery standstills caused by incorrect settings and thus ensures high quality standards.

The machines of the Gerhard Schubert GmbH are principally used for packaging individual products in trays or folding boxes before dispatch. The company manufactures packaging machines and other technology products for the pharmaceutical, cosmetic and food processing sectors. Well-known customers include Nestlé, Danone and Unilever.

Schubert assembles every packaging line from its portfolio of sub-machines. "Our range includes a box erector, grouping, loading and closing machines and a palletizer," explains Rolf Bögelein, control technican at Gerhard Schubert GmbH. "The smallest TLM packaging machine could be just a single sub-machine but our lines contain 5 or 6 on average," he continues. The largest packaging line Schubert has built so far had a grand total of 26.

Automated positioning replaces manual adjustment

"In the past, operators had to use hand wheels to adjust machines when the packaging format changed. But hand wheels always require an operator to be at the machine itself. The adjustment process can be very time consuming. Moreover, it is impossible to eliminate the risk of human error which can lead to rejects or machine stoppages," explains Christian Sura, Managing Director for Sales at halstrup-walcher GmbH. For example, the application module for gluing the boxes must be correctly adjusted because it is vital to apply exactly the right amount of adhesive in exactly the right place.

halstrup-walcher's intelligent positioning systems move to their specified target positions, monitor their own position and report this information back to the control unit. As a result, they can perform format changeovers at the touch of a button – quickly and precisely for a number of axles at the same time. "Automated format changeover makes production of any batch size profitable – even of just one piece. The advantage of this is that the machine user can package the product in exactly the right way," continues Sura outlining the benefits of the system. PSE units can also be installed in locations which are poorly accessible. With hand wheels it is vital to ensure that the wheels are easy to access for operators. This must be taken into account when designing the machine and sometimes involves additional, complex and costly diversion mechanisms.

Fig. 2: Automatic adjustment of the glue application module for gluing boxes: It is vital to apply exactly the right amount of adhesive in exactly the right place.

Intelligent technology for easy handling

The positioning systems comprise a brushless EC motor, gearbox, absolute distance measurement system and motor control. They are self-monitoring and communicate via BUS interfaces. The PSE receives the run command from the control via the BUS communication. It uses the same mechanism to report whether it has reached the target position in the specified time.

The absolute distance measuring system helps to maintain the specified position with outstanding accuracy. It does not require a battery and operates reliably without the need for maintenance. It records a change in position, e.g. due to manual turning, even when no power supply is connected. It will send a message to the control unit reporting that the axle has been turned manually. In contrast to other similar systems, the absolute measuring system records the revolutions directly on the output shaft rather than in the motor. Consequently, gear backlash has no impact on the accuracy of the measurements.

Preventive maintenance minimises standstills

The positioning system is not only able to record whether it has reached the target position but also to monitor a number of other relevant precautionary parameters. The parameters, such as the required torque, are reported back to the control unit. This informs the operator, e.g. if a spindle is no longer running smoothly, a bearing is becoming worn or the internal temperature of the device is too high due to overload. He can then take action to remedy the problem before it becomes serious. This feature simplifies the task of preventive maintenance for the packaging machine.

The device also features intelligent "condition monitoring" **algorithms**. These monitor the positioning systems and are capable of differentiating between reduced performance due to dirt and more serious obstructions. When residues such as solidified grease apear the torque will be increased shortly. More serious obstructions, which must be removed by the operator, trigger an immediate stoppage and a corresponding error message is then sent to the control unit.

Positioning systems from halstrup-walcher have many advantages – which is the reason they are a reliable solution for automating format changeover in Schubert's packaging processes. "Almost all the components are manufactured in Kirchzarten and assembled on an optimised production line. Every finished product is tested automatically to ensure it is functioning correctly," explains Sura. The enormous depth of production expertise at halstrup-walcher allows the company to produce different versions and small batch sizes quickly and flexibly.

Fig. 3: Rolf Bögelein, control technician at Gerhard Schubert GmbH, trusts positioning systems from halstrup-walcher.

An enduring partnership – with further cooperation

After several years of cooperation Schubert is now using PSE units at every point in the machine where positioning is required during format changeovers. "We expected halstrup-walcher to supply advanced, high quality technological products with punctual, quick and flexible delivery – they have met all our expectations. In the rare instances that we discover a problem, it is quickly solved by open and honest communication." Gerhard Schubert GmbH will therefore continue to use positioning systems from halstrup-walcher for automating its packaging machines. In the future, it plans to take even greater advantage of the positioning systems' diagnostic capabilities in order to optimise preventive maintenance of its machine.

Fig. 4: Positioning systems can perform format changeovers in packaging machines quickly, precisely and at the touch of button