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The right bag for everybody

Modular automation makes bag machines flexible and service-friendly

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You require flexible automation components and systems if you wish to implement flexible machine concepts. Servo technology on the motor and drive sides as well as motion control on the control side offer the best prerequisites to achieve this. This is how machines can be comparatively simply adapted or expanded to address specific requirements. However, this isn't the only advantage.

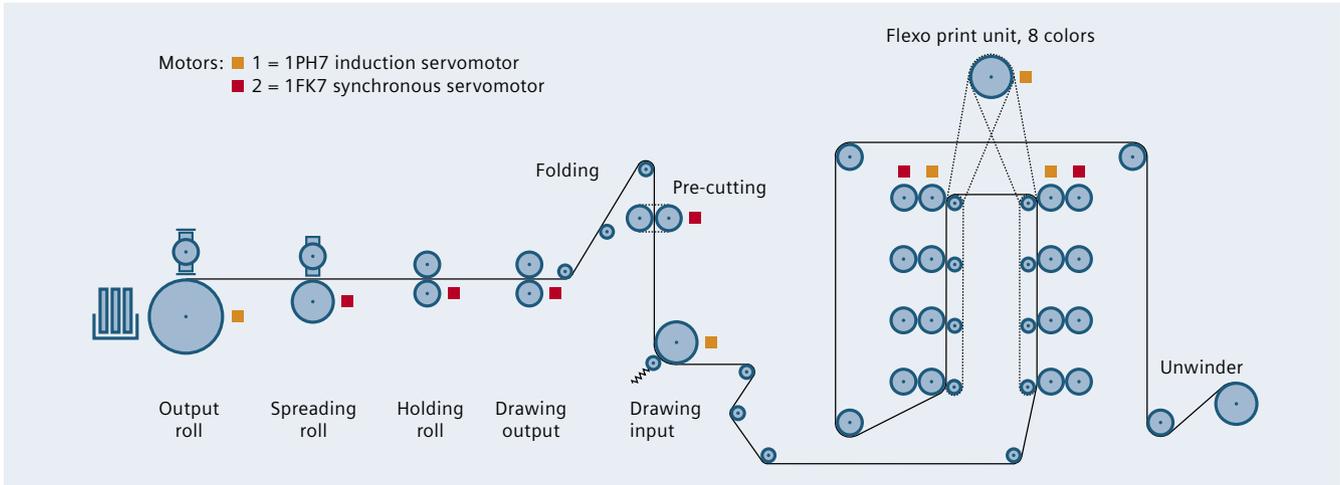
From unwinding from the roll, through flexo printing, up to stacking the finished flat or satchel bags, Holweg, based in Molsheim close to Strasbourg, France uses servo drive technology and the SIMOTION motion control system for all of its machines. These modular lines – with production rates of up to 1,000 bags per minute – run even more harmoniously and quieter than ever before. Modular lines to produce the widest range of paper bags – for bread, bread rolls, baguettes and other foodstuffs – have been Holweg's bread and butter business for decades now. In order to secure its market leadership, in parallel to its established solutions, this company developed a pendant completely driven by electronic servomotors. This is based on a modular drive concept and the SIMOTION motion control system. As a consequence, specific customer requirements can be quickly and cost-efficiently fulfilled with a type of modular system – from the simple bag-making machine with unwinder up to a complex line

with inline flexo printing unit. And especially when it comes to changing over the length, the new approach is significantly more flexible than a conventional line equipped with central drive and line shaft. And not only this, it is also extremely service-friendly.

State-of-the-art motion control

The drive-based SIMOTION D435 motion control system coordinates all of the motion sequences. A virtual leading axis, generated in this controller, defines the production velocity. All of the real axes are also electronically coordinated and synchronized with one another via this virtual leading axis, e.g. in camming and gearing. The SIMOTION Scout engineering system is used to configure and program the system.

A maximum of 32 axes can be controlled from the SIMOTION D435 and up to six servo axes can be internally controlled. Additional servo axes can be simply integrated and coordinated using additional CU320 Control Units belonging to the SINAMICS S120 drive system. „As a consequence, the modular design of SIMOTION and SINAMICS supports the modular design of lines with various machine options – and beyond this, noticeably simplifies the engineering“, confirmed Holweg's engineering personnel. The



additional Control Units for the optional system sections are simply coupled to the SIMOTION control module via PROFIBUS. Communication between the components of the drive system is established via a Drive-CLiQ interface, via which all of the servomotors are linked.

Servo technology in a drive line-up

All of the main functions of the bag-making machine are implemented using Siemens servomotors. The machine in the example described here is an RS26 Servotech for producing flat and satchel bags (in lengths from 205 to 745 mm and widths from 70 to 380 mm) specifically for bread and bakery goods. These replace the central mechanical drive solution that was used up until now – which provides advantages in all of the functions. A 1PH7 induction motor mounted in the top assembly of the flexo printing unit ensures, in electronic interaction with two other induction motors on the bag-making machine, an absolute constant material web tension across the complete line. Further, it is also the master for the subordinate servomotors of the eight inking units. Its printing plate rolls are also driven by 1PH7 induction servomotors in position synchronism to the master, while the 1FK7 synchronous servomotors control the speed of the anilox rolls to apply the printing ink – and which are coupled to the drives of the printing plate rolls. As a consequence, also for flexo printing, maximum flexibility is guaranteed with the highest degree of precision and operating speeds of up to 300 m/minute. An additional significant new feature is the perforating unit that is driven by an electric motor. Instead of interchangeable knife rolls with product-specific diameters

for every bag length, just one single perforating beam is now used across the complete length of the machine. Driven by a 1FK7 High Dynamic servomotor through a cam function, the speed of the beam can be varied so that the moving paper web can be perforated at almost any position transverse to the feed direction – therefore covering the complete range of bag lengths. On the Servotech lines equipped with these new drives, depending on the bag format, up to 1,000 printed bags that are ready for use can be produced every minute.

Integrated safety function

Extremely smooth and harmonious operation and improved accessibility to all machine components are just some of the additional advantages of this fully electronic drive concept. The accessibility has been improved as all of the various mechanical components have, for instance, been eliminated inside this bag-making machine. The setting-up technician or operator can simply select saved „recipes“ at the suspended swiveling SIMATIC Multi-Panel MP277 Touch used as operator panel. The corresponding parameters are then transferred to the SIMOTION D and SINAMICS S120. Neither gear wheels nor other machine elements have to be replaced. The STO, SOS and SLS safety functions integrated in the drive are used to guarantee the safety of man and machine. These functions are controlled from an IM151-7 interface module with integrated fail-safe F-CPU. This detects the safety-relevant signals from protective doors and Emergency Off pushbuttons, and when it comes to safety, is also the master for the SIMOTION controller.

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