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SIMOTION

Kampf Schneid- und Wickeltechnik GmbH addresses increasing demands with a system-based solution

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Integration of the SIMOTION motion control system in the new slitting and spooling machine

Slitting and spooling machines are infrequently just “off the shelf”. They are almost always individually designed to address a particular application. Especially sensitive products manufactured out of new materials demand careful handling, precise monitoring of the production parameters for each coil – and frequently also the associated production documentation. The demands are even increased for standard products: Fast product change, simple threading as well as rational loading and unloading are becoming increasingly more important. This is the reason that Kampf Schneid- und Wickeltechnik GmbH uses a modular approach – with Siemens as partner.

Modularity promises flexibility

The new narrow profile slitting and spooling machine SSP ES30 uses compact modules in line with the modular principle. All of the spooling positions are designed as identical modules with single-axis drives: the SINAMICS S120. These are mounted in groups in spooling stations that are similar in each cabinet. This has the advantage that the manufacturer can simply adapt the degree of expansion of the machine to the various requirements, or can easily and subsequently expand the machine.

What is quite noticeable about the new machine is the fact that the spooling positions are arranged in the direction that the material runs. This is to ensure that tapes cannot twist due to lateral deflection. Further, this arrangement makes it simpler to thread the split product strips, locate the sleeves and remove the product. As a consequence, time and space can be saved – and as an important spin-off, the process overview is improved.

Kampf not only designed the spooling positions to be modular – but also the automation hardware and software. The SIMOTION motion control system from Siemens forms the platform for this. Modular machine controls are supported, in part by a differentiated scalability in the hardware and software. Further, the Converting Toolbox from Siemens includes an extensive range of standard functions to address applications with continuous material webs. SIMOTION is responsible for the motion control for all axes: The unwinder, slitting station, the transport axes as well as the winder and traversing arm of all spooling positions. Here, all of the drives are individually controlled and orientated to a virtual master axis that is applicable for all of the stations in the machine. This means that every winding operation can be individually regulated using the single drive technology employed. Kampf consequentially

utilizes all of these capabilities. For instance, the electronic cam for the traversing arm is dynamically calculated for each individual layer of the wound spool. In addition to the closed-loop speed control in the synchronous group – which is a function of the actual roll circumference – the winder also has closed-loop torque control.

Process quality and production rate are on target

The material tension is defined as a result of inhomogeneous material, the position of the strip to be wound in the path, corrective motion of the edge control, the distance between the spooling position and the slitting station and the number of support and guide rolls that are dependent on this distance. The individual closed-loop controls of each spooling position can compensate for these differences therefore permitting a higher process stability and quality. When compared to machines with a central drive and mechanically coupled spoolers and traversing arms, with the new machine design from Kampf, even sensitive materials can be transported and spooled at high speeds. Especially the edge strips are cleanly wound so there is no process interruptions due to torn edge strips or loosely wound spools. Thanks to the automation, the behavior of the spooling positions can be parameterized. The parameters can be individually set or the settings for the spooling-traversing arm unit selected using a SIMATIC panel located at each spooling station. These settings can also be transferred to all of the spooling positions of the station or even the complete machine. For a new product, only the settings have to be changed. An automatic reference travel supports maintenance and commissioning of the machine. This is only necessary when installing the machine or when replacing a spooling position module. The reason for this is that the motion control system saves the positions of the axes so that when the system is powered up, reference travel is not required.

Using the modular design of the mechanical system and automation, machine versions with between 3 and 48 spooling positions can be implemented without any major modifications. The spooler – traversing arm modules – that have an identical design and are independent of one another – can also be simply and quickly replaced so that faults can be quickly resolved. The modules can be replaced when the system is not winding while the spool assemblies are being changed, therefore reducing idle and downtimes.

Leading-edge platform for customized solutions

According to the automation experts based in Erlangen, Germany, the software structure also profits from the standardization as a result of the modularization. The machine user program is based on the standard blocks provided in the Converting Toolbox. In some cases, the Kampf development engineers maintain the specific versions of the software blocks. On the other hand, not having to make changes to the functions of the Toolbox, over the long term, proves the advantage of the ongoing development of the standard blocks. The engineering costs were able to be kept low even for the first machine of the new series as a result of this strategy. The solution developed for the new SSP ES30 not only can be used for versions of this machine, but Kampf can use it as platform to develop additional slitting-spooling systems. Using the modular machine concept, according to Siemens, the slitting and spooling specialists can optimally respond to different market requirements as well as individual customer demands. Shorter project run times and equipping times, faster product change and a higher process security – are just some of the additional advantages of the concept. Thanks to the flexibility of the recipe-controlled single drive technology, even small batch sizes can be cost-effectively produced.



Kampf can use the SSP ES30 concept as platform for ongoing developments in the area of slitting and spooling



SINAMICS S120 drive system

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