



Holistic packaging solutions from MULTIVAC – here an X-Line deep-drawing packaging machine – are employed in many areas such as the food industry, medical and pharmaceutical industries as well as for manufactured and consumer goods, which is why they require highly flexible control systems.

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MULTIVAC: Interview about PC-based control in fully automated packaging machines

Flexible and future-proof control technology simplifies the implementation of growing packaging requirements

MULTIVAC Sepp Hagenmüller SE & Co. KG in Wolfertschwenden, Germany, depends on PC-based control technology from Beckhoff for all its fully automated packaging machines. Back in 2005, the company decided to replace the microprocessor-based controllers it was using to meet the growing needs of increasingly complex machines with more functionality through greater computing power and storage capacity. In this interview, Claus Botzenhardt and Christian Napravnik describe the benefits generated through PC-based control since then, as well as its potential for implementing innovations in packaging machine construction.

What distinguishes MULTIVAC's portfolio of packaging machines, and what are their main areas of application?

Claus Botzenhardt: The MULTIVAC product portfolio has grown rapidly in recent years. In addition to packaging machines, it also includes solutions for marking and quality inspection, as well as automation solutions and systems for cutting and portioning protein products, and for dough processing. With our holistic solutions, we serve not only the food sector but also the market for medical and pharmaceutical products as well as for industrial and consumer goods. We therefore have a very broad product portfolio.

What are the special requirements for machine automation in the respective segments?

Claus Botzenhardt: The demands made on our packaging solutions are just as diverse as our markets. Let's look, for example, at the hygienic requirements in the food packaging industry, or the requirements in the medical device industry, which have become even tougher recently as a result of the new Medical Device Regulation (MDR). A key point in this context is the CFR21 Part 11 standard covering the process validation in the medical goods industry. Our fully automated lines must meet the individual requirements of all the markets we serve.

This also results in industry-specific requirements in the areas of robotics and vision systems that we as a machine manufacturer must meet. Accordingly, it makes sense that the control technology we employ must be highly flexible and adaptable to industry- and customer-specific requirements without any significant additional effort.

To what extent does PC-based automation provide the optimal technological basis for this?

Claus Botzenhardt: Basically, PC-based control technology provides the best connectivity to a wide range of IT systems. It also makes it easy to connect the controllers with higher-level systems, which provides a foundation for the easy development of IoT solutions. In addition, the operating system makes it less hardware-dependent, which simplifies platform changes considerably since the software can be kept as is. The PC-based technology also enables the use of HMIs based on standard technologies such as HTML5, CSS and JavaScript. Another plus: the PLC and the HMI can run on the same device. Compared to PLC solutions, PC-based control technology offers significantly more effective platforms with huge performance reserves, resulting in a high degree of scalability. A software-based PLC allows users to select precisely the IPC hardware they need for the respective application without having to adapt the software. This makes it possible to achieve enormous efficiency gains. In addition, PC-based control technology enables us to focus on our core competence as a builder of systems and machines, namely the development of market-oriented packaging solutions for our customers. Another advantage is the sustainability of PC-based control, which is based in particular on the fact that existing control software can be easily applied to new IPC systems.

How important is the continuous development of PC-based control to implement innovations in new machine generations?

Christian Napravnik: Very important. We always strive to shorten the development times for our products and thus the time to market. This can only be achieved in cooperation with partners who are also continuously advancing their core competencies. It is the only way to have solid technology with a high degree of development and maturity at our disposal. We also need such partners to allow us to focus on our core competencies and develop the kinds of solutions that the market needs and wants. Examples of this approach include current trends such as multi-touch applications, the use of RFID technology or wireless applications, where we benefit from our partners' market-ready solutions that we can employ directly in our packaging machines.

What role do IoT and Industrie 4.0 concepts play in this context?

Christian Napravnik: Whether we are talking about IoT, IIoT, AI, Industrie 4.0 or digital transformation in general – the underlying technologies and methods are the central pillar for the sustainability of our products and correspond to the development step that is currently being taken. Machines and systems that don't have the necessary connectivity will become obsolete in the near future.



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Claus Botzenhardt, Senior Director HW/SW Framework at MULTIVAC:

“The PC-based control technology from Beckhoff allows us to focus on our core competencies as a maker of systems and machines, namely the development of market-oriented packaging solutions for our customers.”

We are observing this trend also in other industries. The use of PC-based control technology makes it easy to implement Industrie 4.0 concepts because it is based on IT solutions.

What application advantages does the Beckhoff portfolio offer in general?

Claus Botzenhardt: Beckhoff offers affordable all-in-one solutions as well as solutions that are separate and scalable. The stainless-steel modules are another important building block in the production of our hygienic solutions for the food industry. And with its multi-touch solutions, Beckhoff meets the needs of modern HMI concepts that allow users to employ the gestures they have become used to from their smartphones.

How important is the fine scalability of PC-based control in terms of the modularity and diversity of I/O products as well as the IPCs' processing performance?

Claus Botzenhardt: The I/O products from Beckhoff cover our requirements completely. In addition, their PROFIBUS, EtherNet/IP and other gateways provide the interfaces you need for existing or legacy systems. For cost reasons, we prefer all-in-one devices, and we currently employ three different types of IPC control platforms.



The handling modules developed by MULTIVAC for the food industry use AM8800 stainless steel servomotors from Beckhoff. Since they require no extra housing, they make cleaning the systems much easier.

Which features of the TwinCAT application software do you benefit from the most?

Claus Botzenhardt: For MULTIVAC, it is important that the individual software modules can be administered with version control systems. We also benefit from the standardized high-level language programming in structured text, which simplifies the work of our programmers considerably. For example, the ability to use finished function blocks for the camming of axes, PTP movements or robot kinematics reduces our programming effort and therefore our development times significantly.

How important is the consistency of TwinCAT for integrating safety, vision, measurement technology and the Internet of Things?

Claus Botzenhardt: Consistency is one of the main reasons for using a control technology platform like the one that Beckhoff offers. Being able to implement as many aspects of machine and systems automation as possible in the programming environment is necessary for developing customer solutions in an efficient manner. A high level of hardware abstraction is another essential prerequisite. In view of the international character of our group, having the option to run diagnostics on the machine is essential. With the integration of safety technology via TwinSAFE, our HMI can now provide detailed diagnostics. This speeds up troubleshooting significantly.

What are the special advantages of Beckhoff drive technology?

Claus Botzenhardt: The modular structure and high degree of flexibility in particular deliver huge cost benefits for us. Especially in the food industry, motors must be highly resistant to cleaning agents. There are many makers of servomotors, but the number of manufacturers whose drives deliver the quality we need in our environment is rather limited. Our experience with Beckhoff drives has been very positive, especially in this field. In this context I would also like to mention the One Cable Technology, which greatly simplifies both cleaning and maintenance.

What role does the automation supplier's customer service play for you?

Claus Botzenhardt: Getting good support from the automation supplier is extremely important and becoming more so as the control tasks and functionalities become increasingly complex. Only with a strong partner at our side can we focus fully on our core competencies as a builder of machines and systems. There are two different scenarios to consider. One involves getting support when something goes wrong, which is an essential prerequisite for a functioning partnership. The second scenario involves getting support from application engineers that help with implementing the Beckhoff technologies for specific applications and products. Our experience with Beckhoff in this context has been very good so far, both in terms of the response time and the support itself.



Christian Napravnik, Senior Vice President Global Synergy at MULTIVAC:

"We always strive to shorten the development times and thus the time to market for our products. The only way to accomplish this is with partners like Beckhoff, who also continuously advance their core competencies."

What future innovation potential do you see in new products from Beckhoff, such as TwinCAT Machine Learning or the XTS and XPlanar transport systems?

Christian Napravnik: We live in exciting times. Many developments require a new way of thinking about the way machines are designed and built. Particularly when it comes to specialty and highly flexible machines like those used for large-scale lot-size-1 production, systems like XTS or XPlanar can cut the development time as well as minimize technical risks and maximize the transport flexibility since the components already come with a high degree of functionality built in. The same applies for functions in the areas of AI and machine learning. Deterministic models have their benefits, but also limits in terms of their problem-solving abilities. That's why it is so important to have these functions already included in the customary programming environment.

The interview was conducted by Frank Würthner, Industry Manager Packaging Technology at Beckhoff Automation.

More information:

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