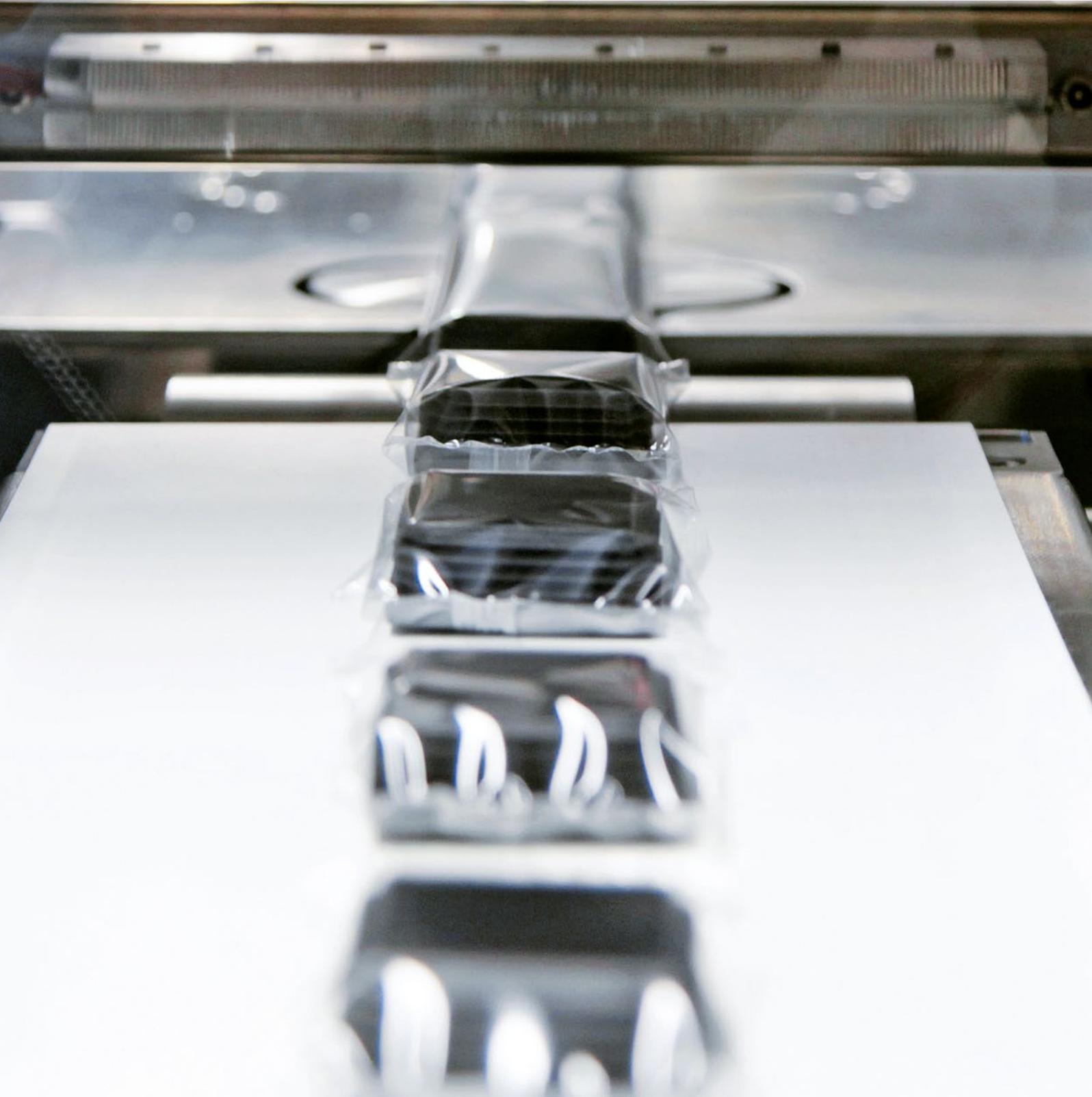


PC-based control automates innovative flow pack machine

Packaging at 500 cycles per minute





The compact B500SH flow pack machine from Bauer Steuerungstechnik can even be used in wet production areas.

Bauer Steuerungstechnik counts on PC-based control from Beckhoff for its latest flow pack machine to ensure fast, accurate and highly flexible packaging processes. The powerful system of modular, scalable hardware and TwinCAT 3 software facilitates a wide range of interfaces, numerous motion control functions and efficient energy management. Other benefits include integrated engineering, easy software updates and rapid remote diagnostics.

When Hartmuth Bauer decided in 2015 to build a flow pack machine, he was already quite familiar with the project's engineering requirements. He founded his company in 1999 as a one-person business for services related to control cabinet design and construction. In 2011, what is now called Bauer Steuerungstechnik GmbH in Bretten, Germany, began developing smaller machines and systems for material handling applications. From the start, Bauer depended on control tech-

nology made by Beckhoff. He recalls the early days: "When we started to build custom-designed material handling systems, we also began to develop smaller machines, such as ergonomic equipment for control cabinet manufacturers. Together with Beckhoff we designed several positioning tools and successfully combined mechanical engineering with control technology." Hartmuth Bauer depended on Beckhoff and the company's Industrial PCs from the start, because



Emanuil Benner, in charge of control technology at Bauer, and Günther Breithaupt, Application Software Engineer at the Beckhoff sales office in Pforzheim, in front of the B500SH flow pack machine.

PC-based control technology and the TwinCAT automation platform delivered the openness and future-oriented capabilities Bauer was seeking: "We appreciate the lack of any interface limitations with this technology, as well as the great variety of I/O components and the numerous software modules with important special functions," says Bauer. "Most importantly, we work with Beckhoff because they deliver complete automation technology from a single source, operate worldwide, while offering flexible and reliable service."

Working together to build an innovative flow pack machine

In the field of control cabinet construction and automation, Bauer Steuerungstechnik offers customized solutions, designed according to customer specifications for a wide range of industries. These include everything from the automobile industry, to forming technology and machinery for the food and medical industries, as well as specialty machines. The latest product is the B500SH, a horizontal high-speed flow pack machine that packages pharmaceuticals and cosmetics, as well as food and non-food items, quickly, gently and safely. The stainless-steel flow pack machine can package almost any material, even those in wet production areas.

Together with Beckhoff, Bauer Steuerungstechnik developed an innovative solution: a machine with a user-friendly visualization concept that stands out with rapid setup capabilities and a compact design. Emanuil Benner, who is in charge of the technical features of Bauer machines, explains: "The exceptional flexibility of the Beckhoff control and drive technology enables the kind of rapid product changeovers necessary in packaging applications. The 15.6-inch

CP2916 multi-touch Control Panel displays all settings at a glance. The operator can call up all necessary data, such as product-specific parameters, and respond instantly to any recipe changes. With the highly dynamic and precise drive technology from Beckhoff, the machine can package products not only quickly, but with exceptional accuracy – from the slowest to the fastest machine cycles.

The machine is controlled via a CX5140 Embedded PC running TwinCAT NC PTP and a TwinCAT Camming software module. In addition to the CP2916 multi-touch Panel, additional Beckhoff components include EtherCAT and TwinSAFE I/O terminals, two AX5206 Servo Drives with AX5805 TwinSAFE cards, and AM8000 servo motors. The drive components are connected via One Cable Technology (OCT), which simplifies the modular approach considerably.

Günther Breithaupt, Application Software Engineer at the Beckhoff Pforzheim sales office, explains: "With the cam scaling function in TwinCAT NC PTP, the curve for the separation process is computed in the PLC and transferred to the NC immediately after the recipe has been selected. As a result, you can change the package length and height directly in the recipe and start running a new product without having to make adjustments on the machine or spending time on conversion. The integration of NC and cam scaling in the PLC with ready-made TwinCAT motion control function blocks made this easy. Also, with OCT employed on the AX5206 Servo Drives, we had the interfaces we needed to integrate another encoder without having to add more hardware. That way, we could compensate directly for any foil slippage."

Standardized and consistent engineering

Hartmuth Bauer lists what he sees as the unique selling points (USPs) of the flow pack machine: "Depending on the specific product and packaging material, the B500SH can churn out 500 packages per minute with a maximum foil speed of 50 meters per minute and setup changeover times of less than 10 minutes." Günther Breithaupt adds: "During the development phase, we worked with Beckhoff to design the system's drives for the desired speed and dynamics. The feeder components can be quickly adjusted to the selected recipe with additional user guidance on the screen and via an integrated control workflow. That way, the system controls the changeover setup process itself."

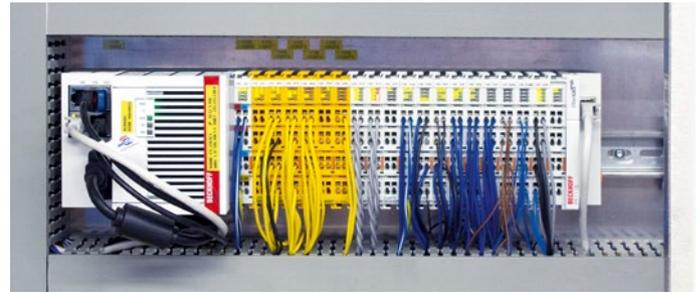
Other benefits arise from the integration of TwinCAT 3 software into Visual Studio®, because it features a consistent engineering environment irrespective of the control system size. Emanuil Benner adds: "We believe PC-based control technology is flexible enough to handle all future requirements, and the open technology enables us to easily import third-party programs" – a feature that demonstrated its usefulness just recently, when a machine had to be retrofitted with a vision system.

EtherCAT power metering terminals for comprehensive energy management

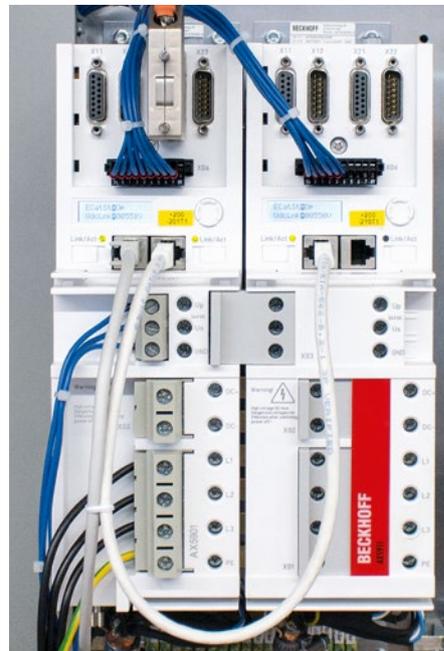
Whatever additional technology the user may need in the future, Bauer Steuerungstechnik will be ready, since the PC-based control technology offers a very broad range of interface capabilities: "EtherCAT, PROFIBUS, Ethernet, CAN – who knows what will be needed for future applications," says Emanuil Benner. "The same applies to new features. When new regulatory requirements had to be satisfied, the EL34xx EtherCAT power measurement terminals were available to supply the machine with functionality for a comprehensive energy management system. Now users can even document how much energy was consumed to package each individual product."

Since controlling the flow pack machine requires considerable computing power, Bauer Steuerungstechnik selected the CX5140 Embedded PC with Intel® Atom™ quad-core processor. One core handles the NC functions, while the second handles the PLC operations. Visualization and image processing run on the two remaining cores. With these features, Bauer Steuerungstechnik is confident that the company is ready for the future.

Remote control and maintenance capabilities are other areas where PC-based control scored important points for Hartmuth Bauer, particularly since their machines are used all over the world. He didn't want to have to use VPN routers – as required with traditional PLC technology – to access the machine or be forced to use a third-party provider. "With PC-based control, we have full access to the system. An Internet connection is all we need to look at everything down to the individual axis, no matter where the machine is located."



A glimpse into the control cabinet: The Beckhoff CX5140 Embedded PC runs packaging processes of the flow pack machine via EtherCAT and TwinSAFE I/O terminals.



Two AX5206 Servo Drives with AX5805 TwinSAFE option cards control the AM8000 OCT servomotors.

Further information:

www.bauersysteme.com

www.beckhoff.com/TwinCAT3