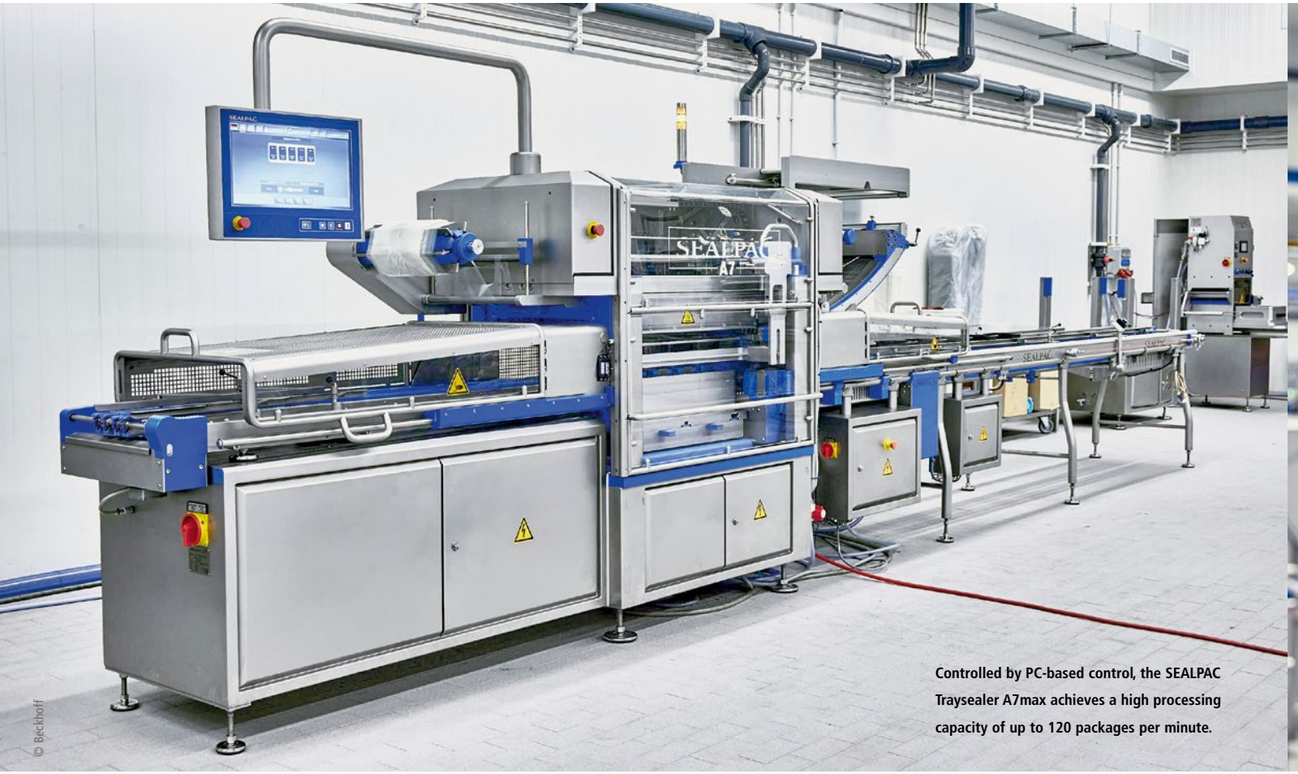

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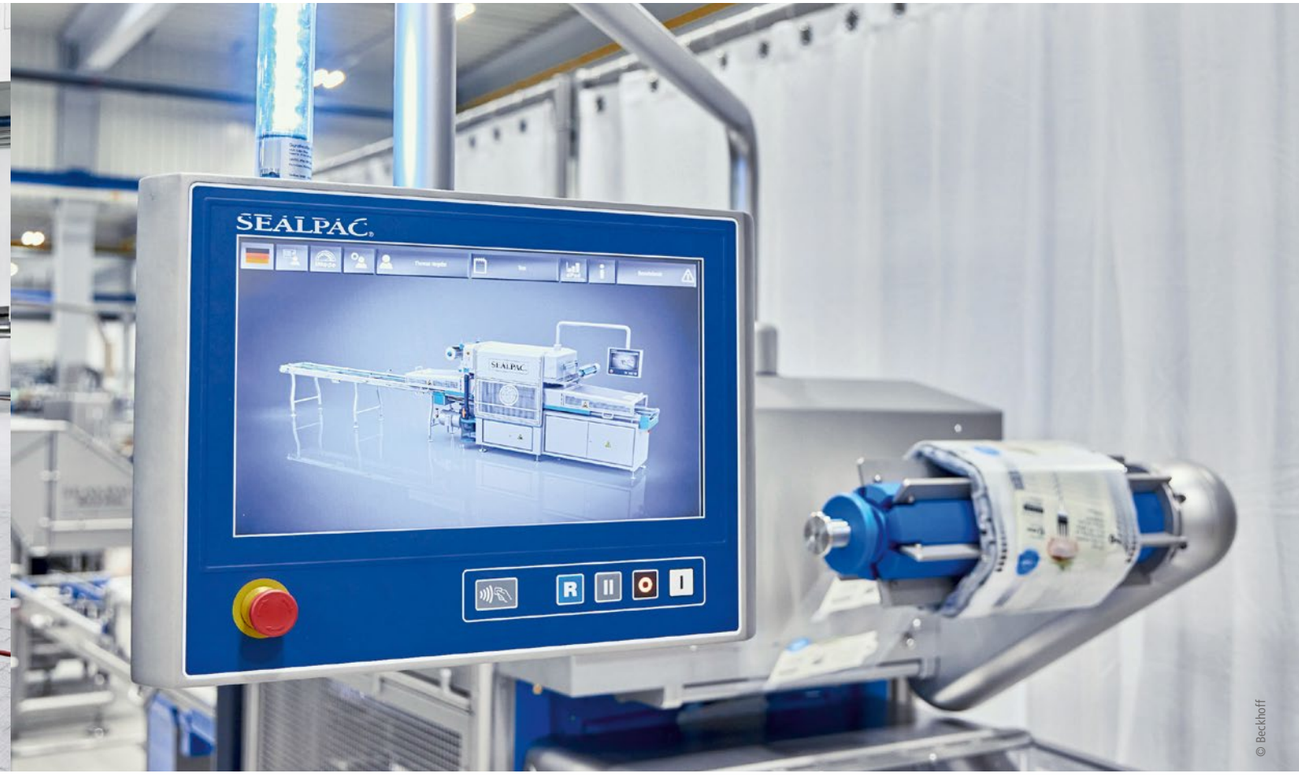
Controlled by PC-based control, the SEALPAC Traysealer A7max achieves a high processing capacity of up to 120 packages per minute.



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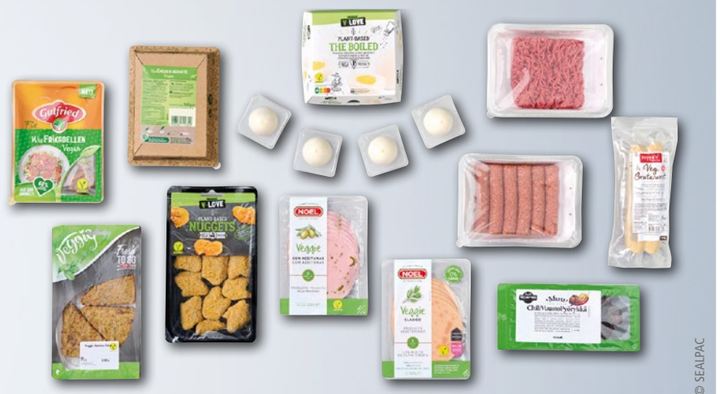
PC-based control and drive technology in packaging machines for the food industry

Open and integrated automation unlocks optimization potential

SEALPAC GmbH, a globally active manufacturer of food packaging machines headquartered in Oldenburg, Germany, found that their old automation technology had reached its limits. The open and integrated PC-based control system solution from Beckhoff brought SEALPAC up to speed, and in the process uncovered a variety of options for optimization in engineering and machine operation, with full conversion achieved at just 14 months.



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The customized stainless steel multi-touch control panel (the CP3918 for the A6max is shown here) and the display created with TwinCAT HMI enable optimal machine operation.

SEALPAC offers solutions for a wide variety of food products and packaging.

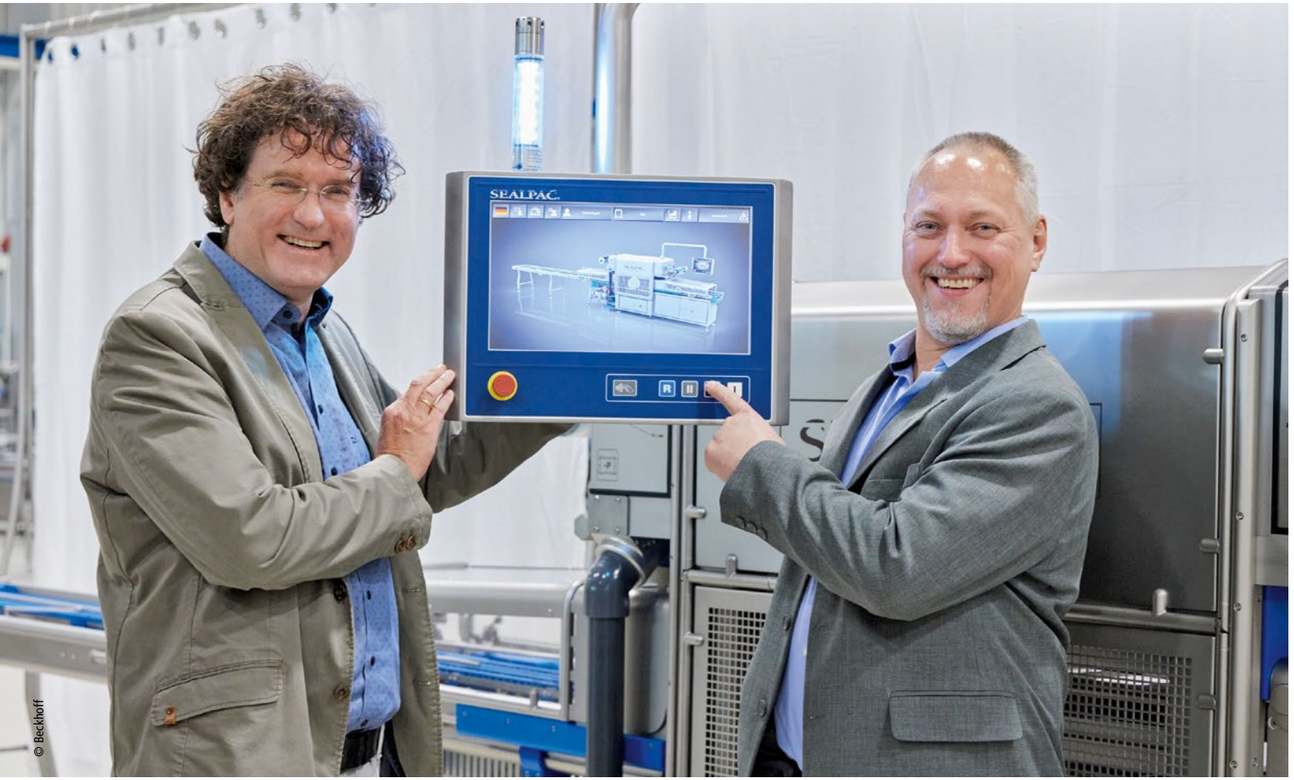
Thomas Hegeler, project manager at SEALPAC, confirms that PC-based control and drive technology can be implemented quickly: "The control system for the entire packaging cycle, including the safety application, took a mere six months to convert, meaning that we could start delivering packaging machines to customers in just over a year. We have implemented this for a variety of systems, including our Amax tray sealer series, and will successively replace the control technology in our other machine types as well."

The Amax series tray sealers are high-performance machines for automated food packaging in a variety of performance classes. Machines need to be able to reliably process sustainable materials, which are becoming increasingly lightweight, but equally, they must also be efficient, economical and precise. This means that the demands in terms of machine technology are constantly growing, while the operation and maintenance of the machines need to be simplified.

PC-based control for more efficiency

PC-based control is an open, integrated and, above all, tried-and-tested system for control and drive technology that provides the perfect solution to elicit more efficiency in machine automation. Thomas Hegeler explains the impetus for SEALPAC: "We needed end-to-end automation, right up to the HMI, to provide a holistic machine concept with a wide variety of machine types. The technology that we had at that point was holding us back from reaching this goal. PC-based control has significantly reduced the time and integration work here."

Beckhoff Sales Engineer Thomas Kaiser clarifies a particularly important aspect here: "PC-based control can be finely scaled and thus optimally adapted to the respective application, and even to more stringent requirements later on if needed. For the tray sealers, for example, an industrial PC with the average



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Thomas Hegeler (right), project manager at SEALPAC, and Thomas Kaiser, sales engineer at Beckhoff, in front of the A6max tray sealer

processing power of an Intel Atom® processor would suffice, but a C6032 ultra-compact Industrial PC with Intel® Core™ i5 CPU is used due to the powerful HTML5 visualization implemented with TwinCAT HMI." In particular, visualization and machine data processing are of great importance to SEALPAC, as Thomas Hegeler confirms: "This is a main focus for us, which will certainly lead to heightened control requirements in the future. As a modular software platform that is also easy to use, TwinCAT offers all possibilities, e.g. with functions for motion, HMI, vision and machine learning. In addition, the hardware can easily be scaled, meaning that if we need to, we can simply use the C6032 with a more powerful processor without having to change the IPC form factor and thus the machine design."

Packaging machines need to be extremely capable, especially in the motion sector. With EtherCAT-based drive technology from Beckhoff, SEALPAC was able to improve here in three aspects, according to Thomas Hegeler: "Overall, working with the Beckhoff experts, including our direct contacts in product development, was a huge advantage. In drive design, which is incredibly complex, this has really paid off and has cut development time massively. The second aspect is the high quality and performance of the Beckhoff drive technology – the AX8000 multi-axis servo system and AM8000 servomotors. With our previous servo technology, we had reached our limits in terms of speed. Thirdly, we need fewer types of motors and, with the AX8000 system, we have machines that are suitable for all voltages worldwide, up to the 200 V/3-phase grid in Japan. This also resulted in a significant reduction in inventory."

Convenient machine operation as an important criterion

Optimum machine operability is a crucial for SEALPAC. Customized CP39xx stainless steel multi-touch Control Panels from Beckhoff are used as hardware to assure this, with a 15.6-inch display for smaller machines and an 18.5-inch version for larger systems. Thomas Hegeler explains: "Multi-touch, high-quality full-HD graphic displays and a CI-compliant design with labeling and matching push button extension constitute clear quality criteria for us in machine building. Their importance will definitely grow in the future, due to the increased use of graphics and animations and the increasing prevalence of smartphones and how they shape operators' expectations and habits. In some instances, machine operators already have a say in choosing machinery."

Thomas Kaiser describes some of the implemented customer-specific features of the control panel: "One requirement was to be able to easily integrate SEALPAC's own RFID solution. This was easy to implement with minor adjustments, based on our standard housing. Furthermore, the housing, including the stainless steel mounting arm adapter was precisely matched to the appearance of the sandblasted machine housing by sandblasting it with the appropriate grain size."

The basic prerequisite for fast and smooth visualization is sufficient computing power, as provided by the C6032 ultra-compact Industrial PC. According to Thomas Hegeler, the extremely compact design swung the decision, as control cabinet space is always in short supply. As a modular IPC variant with scalable interface and function extensions, the C6032 also offers excellent connection adaptability for future system additions and has proved its worth in this application by running without any failures.

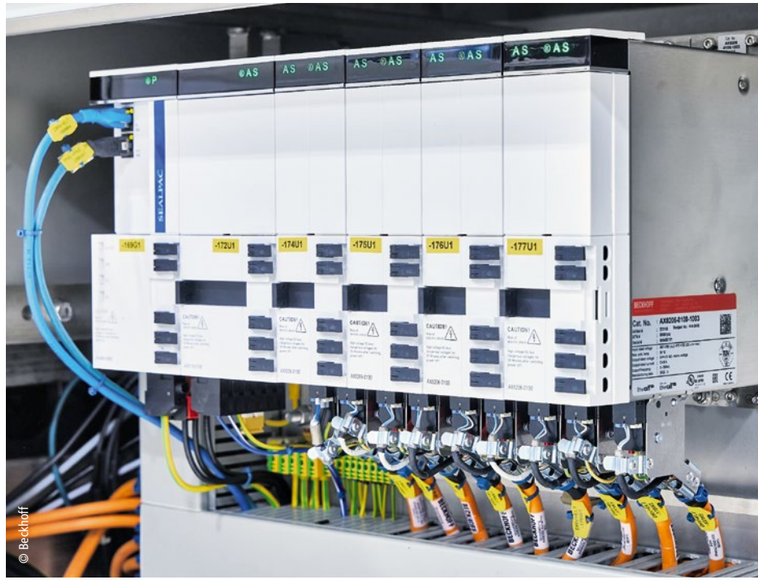
Fast EtherCAT communication, efficient One Cable Technology

With regard to data communication, PC-based control from Beckhoff also offers numerous application advantages for SEALPAC. The system's openness and the wide range of EtherCAT Terminals make it easy to integrate third-party components, such as valve terminals, frequency inverters, and IT into the control technology. In Thomas Hegeler's experience, EtherCAT has also made good on its claim of being the fastest Industrial Ethernet system on the market, demonstrating this in practice with its excellent performance.

The EtherCAT-based servo drive technology from Beckhoff also simplifies machine design in other ways, clarifies Thomas Hegeler: "One Cable Technology (OCT) from Beckhoff significantly reduces the time and material required for cabling. In addition, the machine looks far cleaner and is more ordered. In addition, the electronic identification plate makes commissioning easier." Customization also played an important role here: "The motors that we had previously used were connected in the classic way, via two cables, but the cables were very thin, making them easy to lay within the machine. However, in close cooperation with Beckhoff, a comparable solution was found here for the OCT motor connection cable: since the motors do not require brakes, two cable leads could be dispensed with, thus reducing the cable diameter. Furthermore, a motor connection plug angled at 60° has been developed, which saves additional installation space. All of this has helped us a lot."

Future-proofed with PC-based control

The continuous further development and portfolio expansion within the scope of PC-based control offers an additional high level of investment protection with a view to future machine requirements. Beckhoff's TwinCAT/BSD operating system is included in the latest product innovations that SEALPAC will test. It was designed as a multi-core-capable, Unix-compatible operating system for TwinCAT 3 real-time applications and unites the advantages of Windows CE, namely that it is low cost with a small footprint, with the numerous features of the major Windows operating systems. Thomas Hegeler states: "We see the advantages here in the high performance, despite the small footprint, and in gaining independence from Windows, which some customers want for security reasons, among other things."



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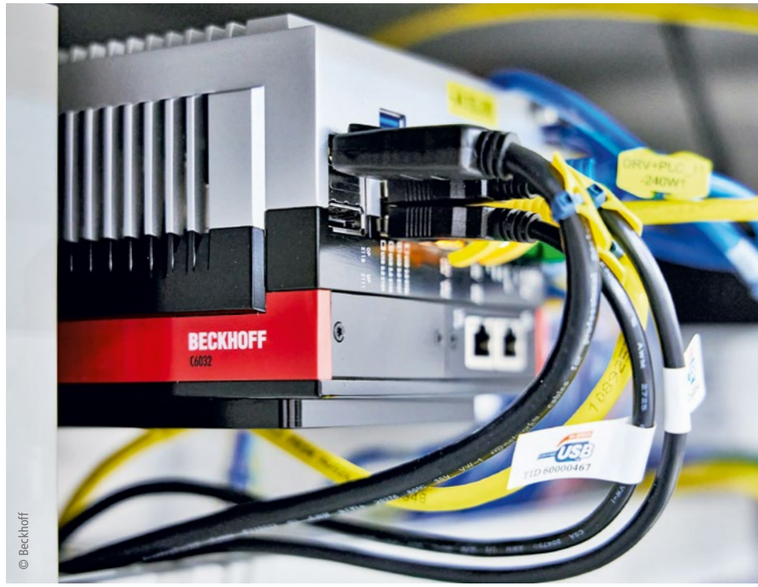

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Above: The AX8000 multi-axis servo system, in conjunction with the AM8000 dynamic servomotors, ensures that the packaging processes are run with precision.

Below: The C6032 ultra-compact Industrial PC offers sufficient computing power for both machine control and powerful visualization.

More information:
www.sealpac.de/en
www.beckhoff.com/packaging