

BECKHOFF New Automation Technology

Maximum efficiency and flexibility:
PC-based control for the packaging industry

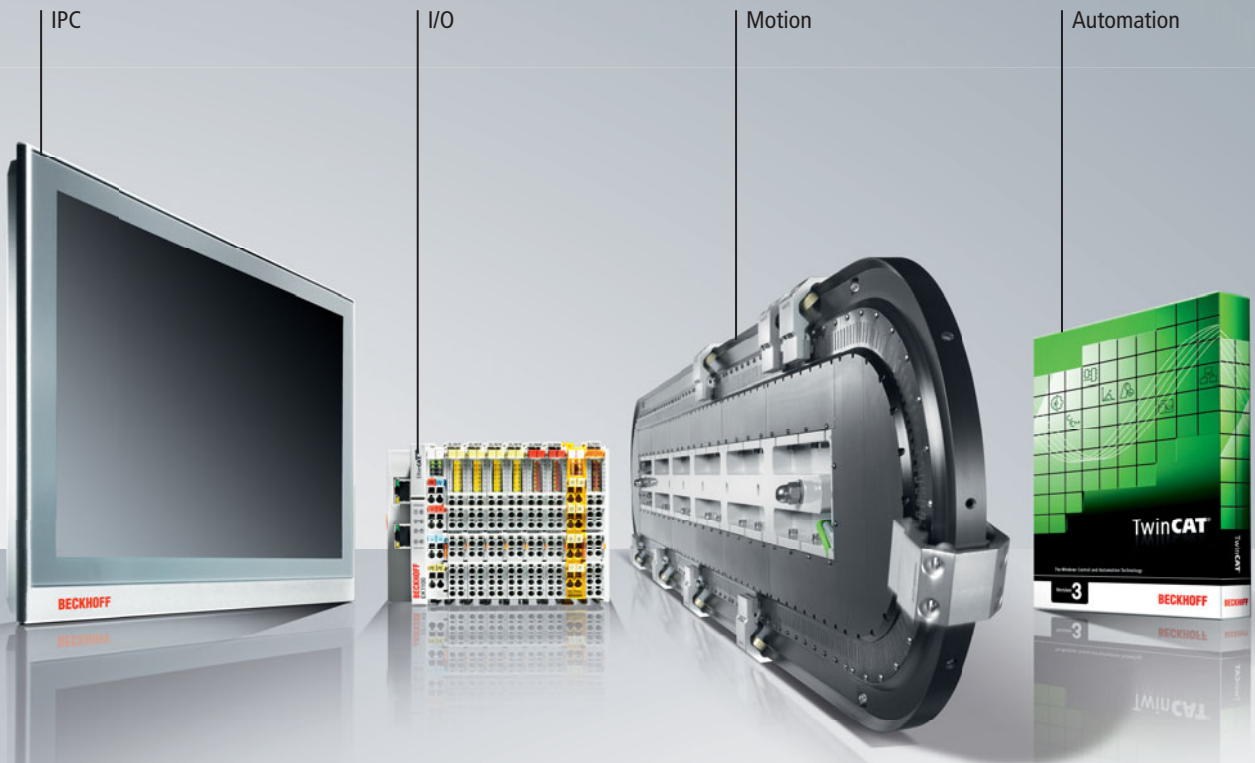


IPC

I/O

Motion

Automation



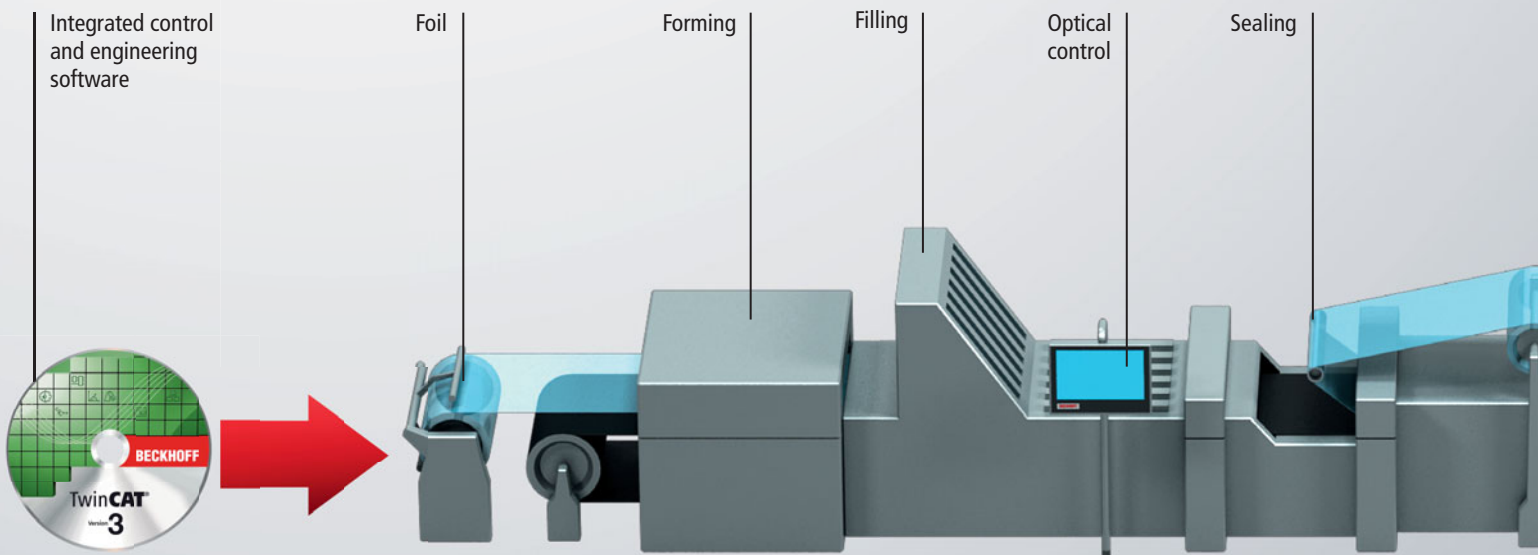
PC-based control, the integrated control platform ...

With its PC- and EtherCAT-based technology, Beckhoff offers a control solution for highly efficient, flexible and compact packaging machines. Because of its openness and its universal design, PC-based control delivers technological and economical benefits. TwinCAT is the standardized software and engineering platform for all automation processes from PLC, motion control and robotics to condition monitoring. All control and drive components feature maximum scalability as well as open hardware and software interfaces for consistent communication from the sensor to the cloud. Other benefits include an integrated safety solution and support for common industry standards like FDA, EHEDG, Weihenstephaner Standards, OMAC, and GPM.



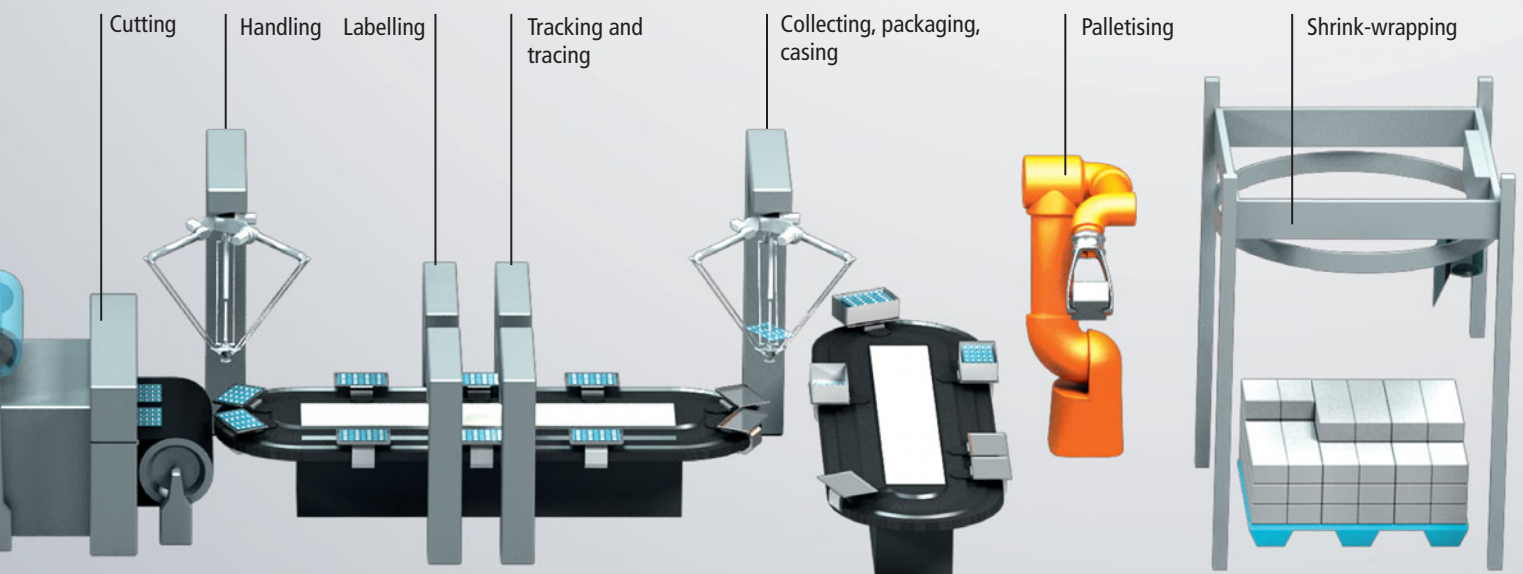
... for highly flexible, resource-efficient packaging machines

Packaging requirements vary from industry to industry and from product to product. What they all have in common, however, is that they focus more and more on quality, flexibility, and most of all resource efficiency. PC-based control technology from Beckhoff makes this possible with its exceptional performance and the openness of the TwinCAT software platform, which integrates all automation functions, including measurement technology and simulation. PC-based control is the ideal solution for applications involving high speed and precision or complex motion control interactions. It also delivers maximum flexibility for applications where packaging systems must be quickly adaptable to changing requirements or be able to easily accommodate new features.



Benefits along the entire line: Integrated PC-based control ...

With PC- and EtherCAT-based control technology from Beckhoff you can automate individual packaging machines as well as entire lines. All steps such as forming, filling, sealing, labelling, collecting, boxing and palletising can be programmed and controlled via a single platform. Optimally coordinated hardware and software interfaces as well as extensive expertise in implementing each process step guarantee a high level of process stability. Applications can be realized by Beckhoff, a solution partner, or the customer himself. The Beckhoff portfolio comprises everything you need for a technologically and financially superior packaging solution.

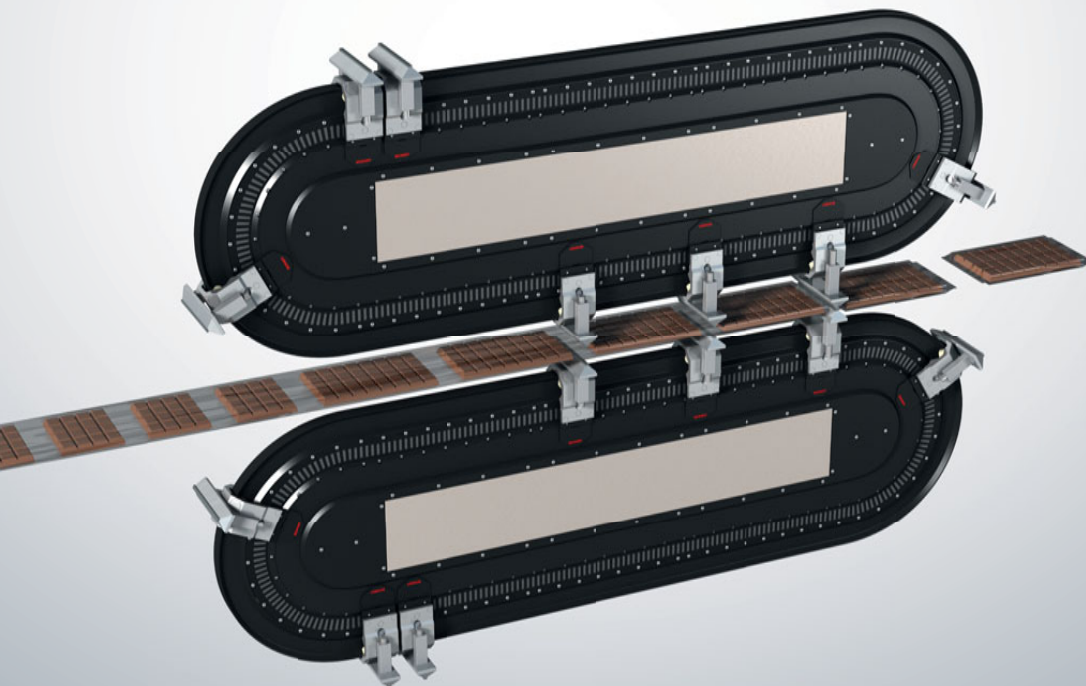


... from primary to secondary packaging

On the hardware side, Beckhoff offers a modular portfolio of Control Panels, control cabinet PCs and panel PCs, as well as a complete spectrum of I/O modules (also in high-protection versions) and highly dynamic servo drive solutions. On the software side, our TwinCAT control software with its many libraries for items like stepper control, cam plate functionality, fiducial checking or cross-cutting meets all the standard requirements you find in packaging machines. The PackML OMAC standard is also fully supported. With PC-based control, packaging machines are equipped for the needs of today and tomorrow. Requirements like track-and-trace and instant adaptation to variable characteristics of the goods being packaged can be implemented flexibly and economically. At the same time, the PC-based technology provides more computing performance and storage space to meet the constantly rising demands of increasingly complex machines with more and more features.

Resource-efficient packaging: Maximum process speed and precision ...

How can you implement packaging solutions that fill the correct amount while reducing the amount of packaging materials? How can you reduce the energy consumption of the entire process chain? Implementing PC Control ensures that the consumption of resources is reduced to the absolute minimum. What makes the difference is the XFC ("eXtreme Fast Control") technology. With I/O response times of less than 100 μ s, the system scans the machine's status up to 10,000 times per second so that the process can be controlled with exceptional precision and repeat accuracy. With no need for special hardware, XFC implements extremely fast and accurate control solutions for packaging machines.



In combination with the XTS, PC-based control opens the door to new ways of saving on packaging material. The example shown combines the benefits of horizontal and vertical form, fill and seal machines to deliver high process speed and fast tool changes with no mechanical intervention. XFC and the XTS makes it possible to place the seal as closely to the product as possible by synchronizing printed fiducials with the sealing guillotine.

... with minimum material usage

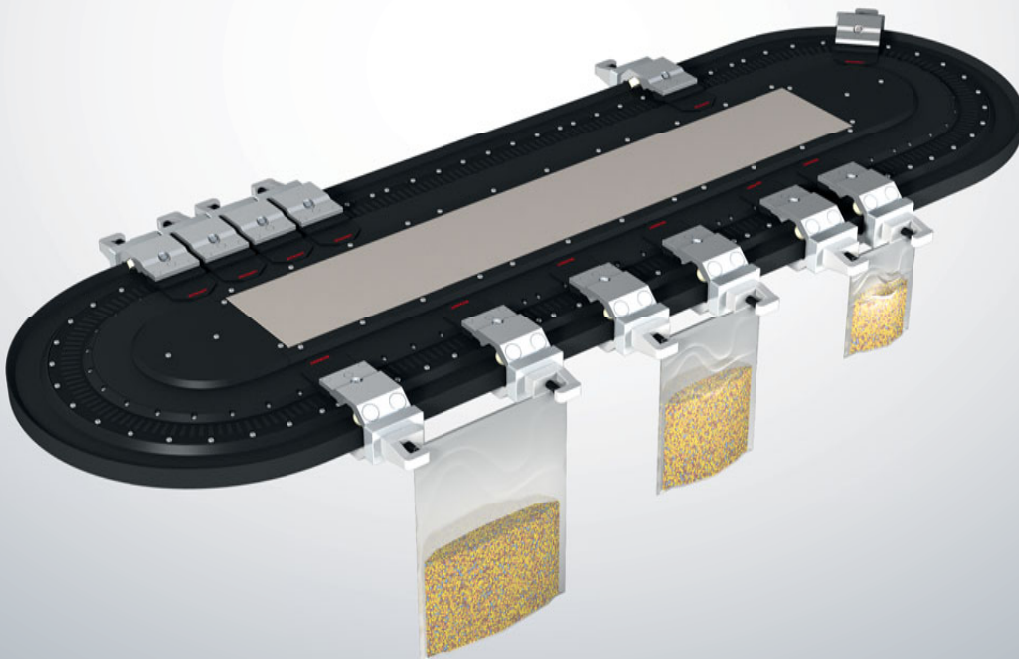
PC- and EtherCAT-based control ensures perfectly synchronized processes and motion control sequences with shorter cycle times for more throughput. The technology's quick and precise response to fiducials makes it possible to save on packaging material, for example by placing products more closely together in blister packs, which reduces the amount of sealing foil needed as well as any waste. And the ability to precisely control the sealing temperature allows you to use thinner plastic films. The fast and highly accurate process control capabilities also let you minimize the wall thickness of PET bottles as well as reduce the amount of paper and aluminium when producing cardboard containers. And the more accurate approximation of the minimum fill level generates significant material and cost savings when packaging high-volume products.

The closer the seal is to the product, the less packaging material is being used. Thanks to the high-precision capabilities of the control system, the temperature of the sealing bar does not affect the product being packaged. XFC makes it possible to perfectly synchronize the sealing knife with the process.



Flexible packaging: Fast and efficient product and format changeovers ...

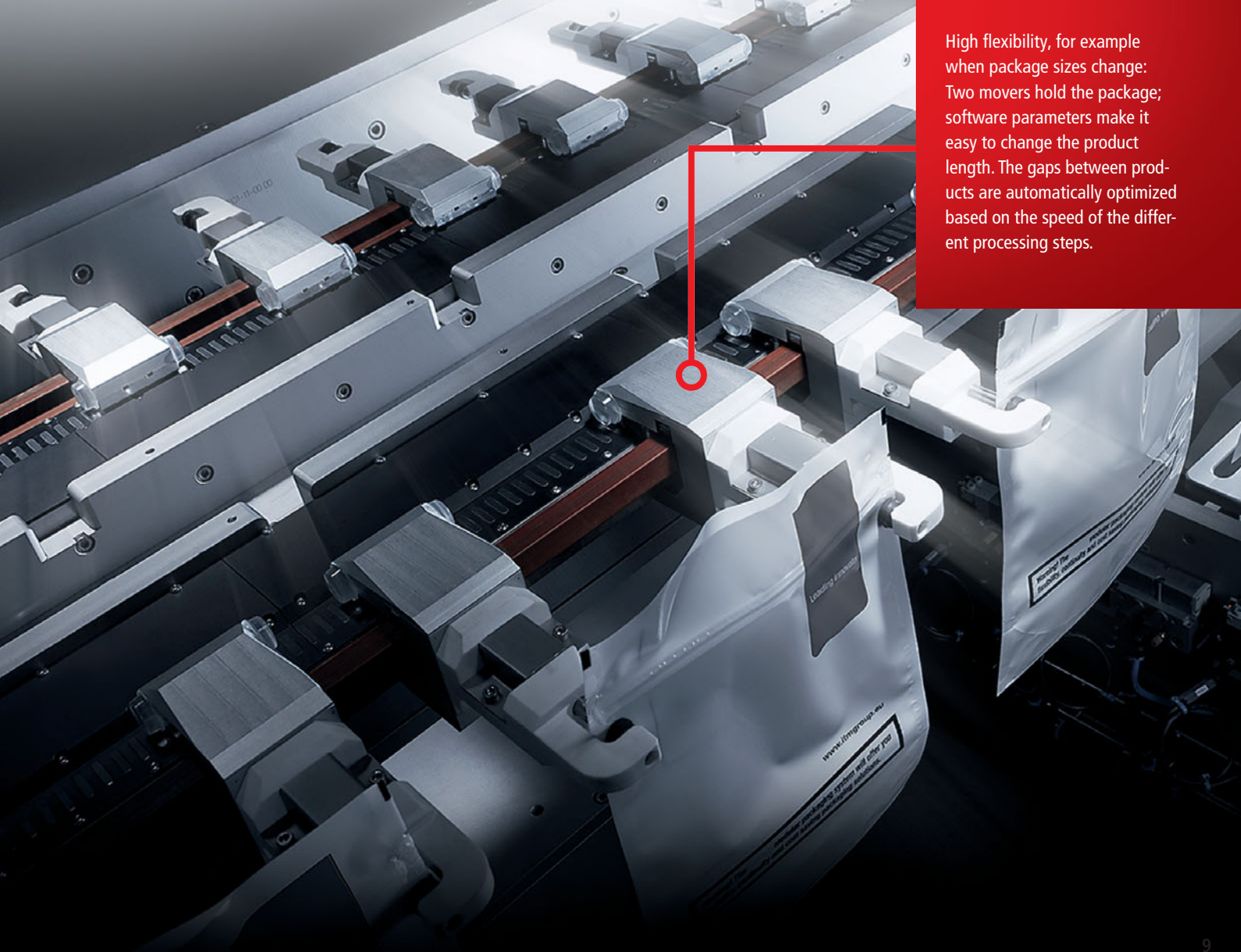
Faster format changeovers, shorter job runs, lot sizes of 1 for on-demand production and the ability to respond quickly to technical problems require a control solution that responds to new requirements with maximum flexibility and minimum effort. This is where the Beckhoff's PC Control philosophy truly shines. The PC-based control platform executes machine setup changeovers due to product or package changes essentially in software by adapting the process parameters. This speeds up the process considerably, resulting in faster product changes and more line efficiency for the operator. Easy format changeovers ensure more productivity even with many short runs.



The XTS lets you handle packages with varying fill levels or format sizes without having to change the machine's mechanics. To implement a special offer like "3 plus 1", you simply change the appropriate parameters with a mouse click so that four instead of three movers transport the items to the packaging station.

... are software-based with PC Control and the XTS

The compact eXtended Transport System (XTS) from Beckhoff delivers a unique advantage. It makes packaging machines more flexible by replacing complex and expensive mechanics with software. TwinCAT provides specially tested software function modules for typical XTS applications that only require you to set the parameters. For example, you can change the distance between the movers (i.e., the units being packaged) during runtime. If a filling station fails due to a defect, the system simply skips it, thus avoiding a line stop. The XTS also provides great flexibility in applications where different package sizes or temporary changes must be accommodated.



High flexibility, for example when package sizes change: Two movers hold the package; software parameters make it easy to change the product length. The gaps between products are automatically optimized based on the speed of the different processing steps.



Control Panel: Multitouch display and Control Panel



Industrial PC: Control cabinet and Panel PC



Embedded PC: IPC with integrated I/O level



EtherCAT I/Os: Broad I/O spectrum in IP 20 and IP 67

The Beckhoff system for more efficient packaging machines ...

Beckhoff offers control solutions in all performance categories for all applications in the packaging industry – from rail-mounted Embedded PCs with integrated I/O units to high-end Industrial PCs with multi-core processors. A wide range of multitouch panels delivers state-of-the-art operating convenience. With the ability to handle over 400 signal types, the I/O components serve the full spectrum of sensors and actuators. And with TwinSAFE, an integrated safety solution is available for I/O and motion control applications. The drive technology portfolio ranges from compact servo terminals to powerful EtherCAT drives and highly dynamic servo motors with one-cable technology. TwinCAT integrates the engineering environment and the controller in a single software platform.



Highly dynamic servo Drive Technology



Servo terminals: Compact Drive Technology



XTS: Linear Transport System

TwinCAT: Software for engineering and runtime



TwinSAFE: Integrated safety solution



EtherCAT: Integrated real-time fieldbus for ultra-fast process communication

EtherCAT®

... also available in stainless steel for the food industry

For packaging applications in the food, beverage and pharmaceutical industries, Beckhoff offers a complete control solution in stainless steel with "hygienic design" that meets the strictest sanitation and cleanroom requirements. Control Panels and Panel PC series in high-quality stainless steel housings are suitable for IP 65 conditions. EtherCAT Box I/O modules are also available in stainless steel housings. They meet the requirements of the IP 69K protection class and are designed to be installed directly on the machine. The AM8800 stainless steel servo motors feature protection class IP 67 (IP 69K optional) for use in extremely harsh or corrosive environments.



Stainless steel EtherCAT Box in IP 69K

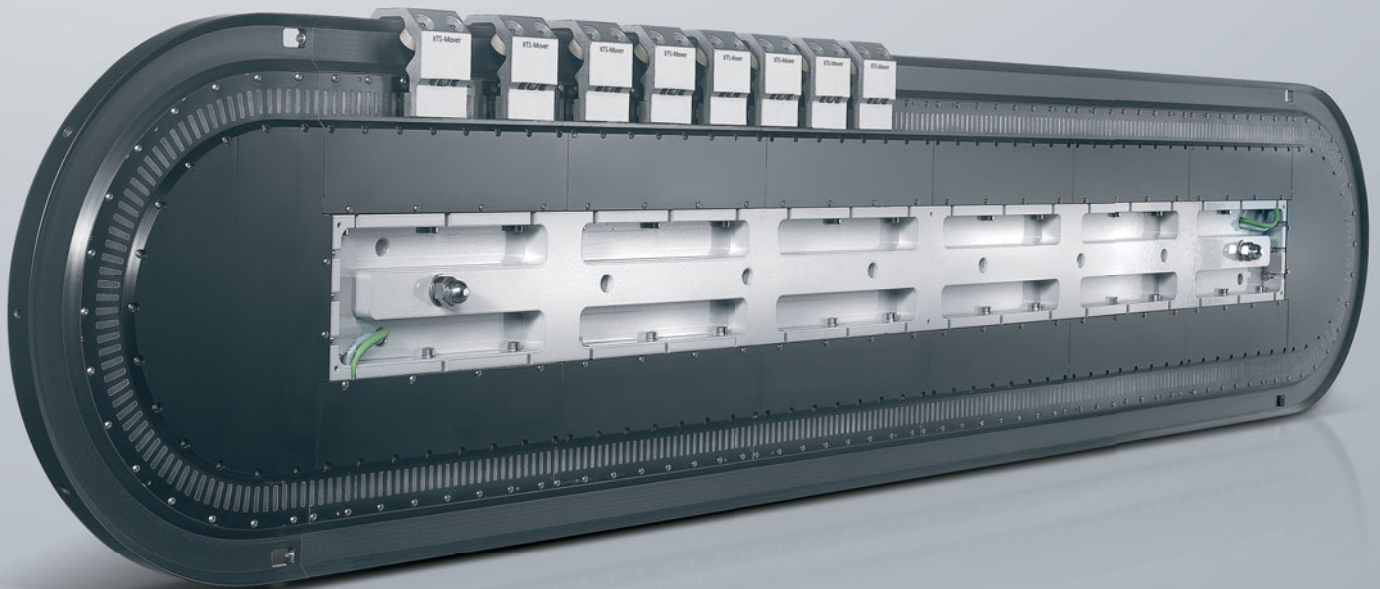


Stainless steel servo motor in IP 67 or IP 69K

eXtended Transport System: Software replaces mechanical components ...

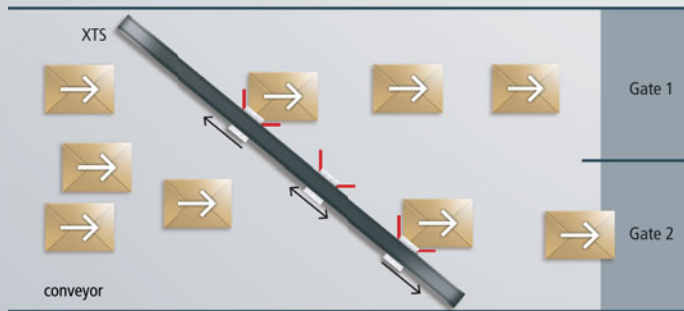
The linear XTS transport system from Beckhoff sets a new milestone in packaging technology. XTS combines the benefits of linear and rotary transport systems. The result: flexible routing that lets you use all the benefits of direct-drive such as high dynamics, positioning accuracy, low oscillation, lack of wear, and low power consumption. Since both straight sections and the curves are used for the material transport, there are no empty trips, making for a faster overall process. And the TwinCAT automation software makes the engineering process easy with its integrated standard features such as automatic accumulation, collision prevention and shock prevention.

► www.beckhoff.com/XTS

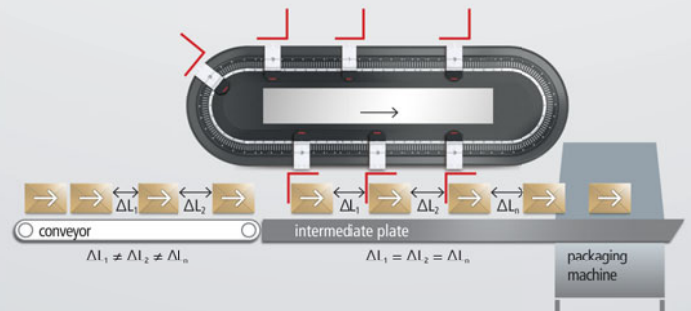


... and reduces the packaging machine's footprint

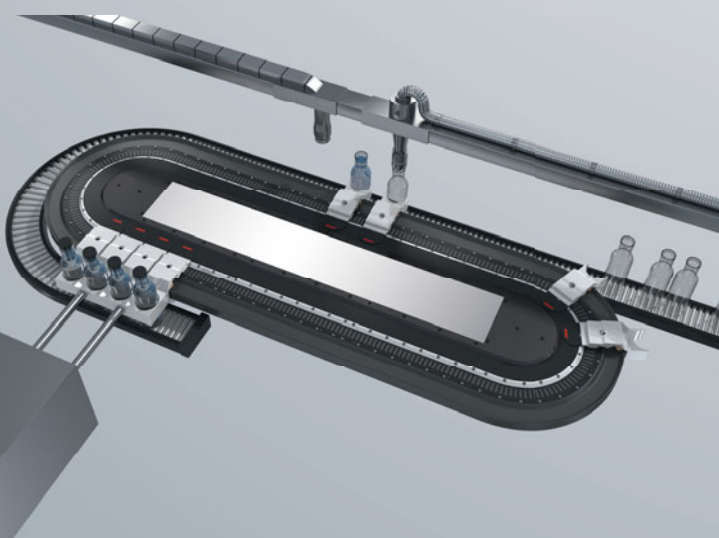
The XTS opens the door to completely new machine designs with smaller footprints. The travel profile no longer requires complex mechanical components, and up to 50 percent lower machine sizes deliver significant cost benefits. Most of all, however, the XTS improves the packaging process: Products can be moved independently, packaging steps can be perfectly synchronized avoid standstills, and function changes are quick and easy to implement because they are entirely software-based. Product changeovers and cleaning are easy. Maintenance activities are also very efficient, because the control software monitors all movers and recognizes any overloads instantly.



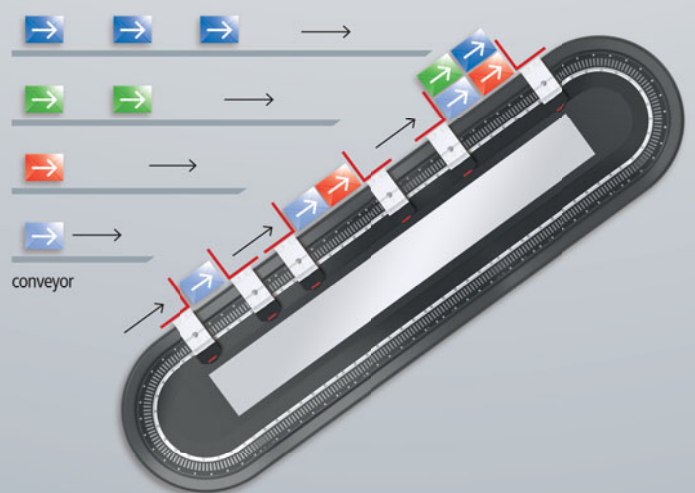
In a distribution system, the XTS splits an incoming product stream into multiple streams (two in this case) inexpensively and with great flexibility.



The XTS makes it easy to implement a feeder with distance adjustment that synchronizes products arriving at different intervals with the downstream process.



As a carousel-type solution, the XTS is ideal for bottling applications that must be able to process a continuous product stream in a discontinuous fashion.



Used as a grouping system, the XTS can easily combine products arriving on multiple conveyor belts into predefined and easily changed groups and move them to the next station.

TwinCAT: One software platform for engineering and runtime ...

The TwinCAT automation software forms the core of the PC-based control platform for PLC and motion control. It consists of runtime systems for program execution and the engineering environments for programming, diagnostics and configuration. It features all major programming languages of IEC 61131-3, including its object-oriented enhancements for real-time applications. C/C++ and MATLAB®/Simulink® modules can be integrated into the IEC environment via interfaces or operated independently in the TwinCAT real-time context. Open interface provide easy integration into existing IT structures.

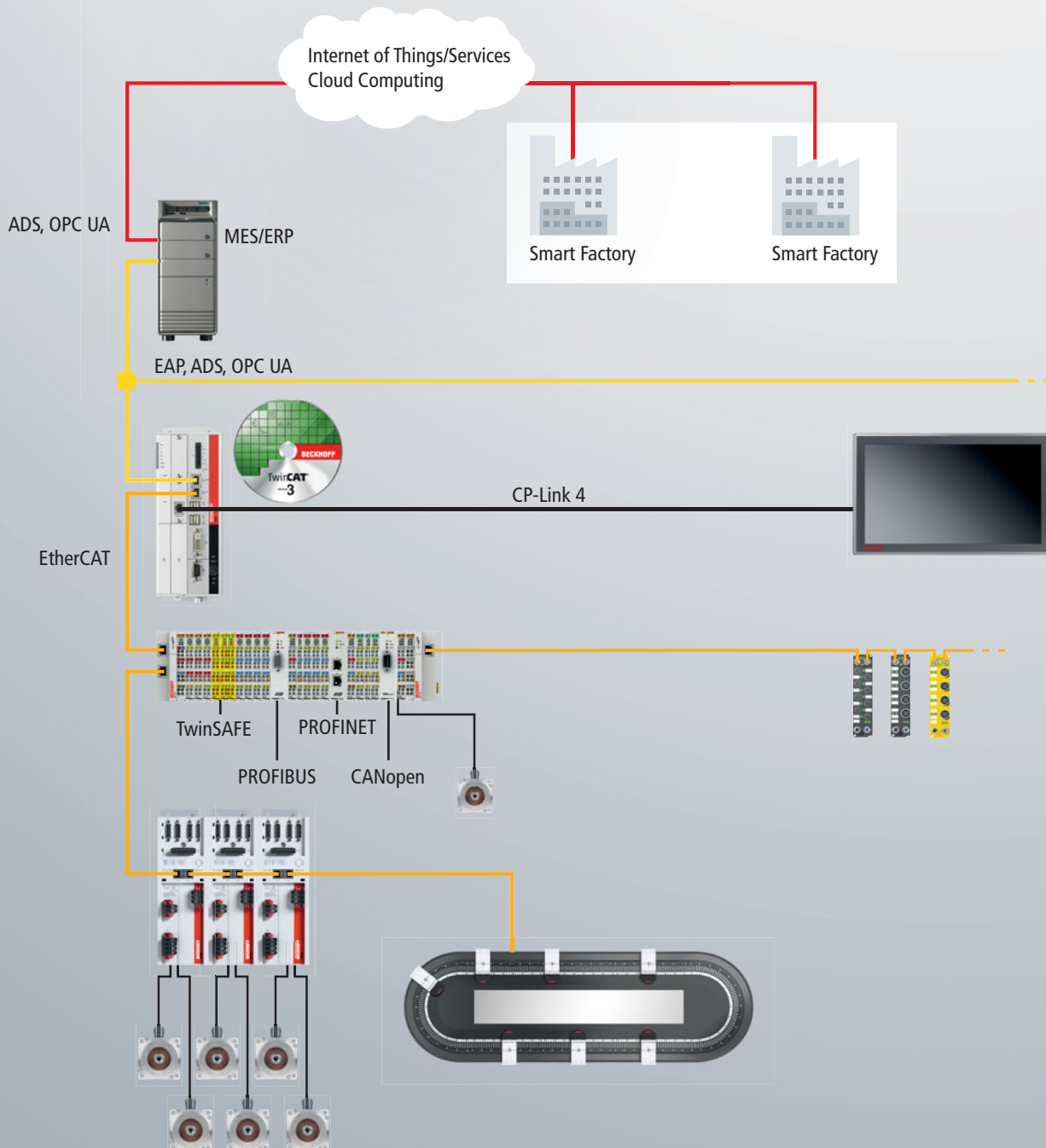
► www.beckhoff.com/TwinCAT



... for all machine types and entire lines

TwinCAT provides the packaging machine manufacturer with an integrated environment for any control task. By making full use of the processor cores, TwinCAT replaces additional hardware such as separate robotics controllers with software and integrates them into the central control environment. TwinCAT delivers the basic technology for "smart factories" already today. With the TwinCAT Automation Device Specification (ADS), the EtherCAT Automation Protocol (EAP) and OPC UA it has everything you need to implement the vertical and horizontal integration required for "Internet of Things" concepts.

► www.beckhoff.com/industry40



On the factory floor: Packaging solutions from Beckhoff

PC-based control from Beckhoff is in use in packaging machines all over the world. The "Packaging Special 2014" issue of Beckhoff's PC Control magazine shows the diversity of applications on the basis of selected references.

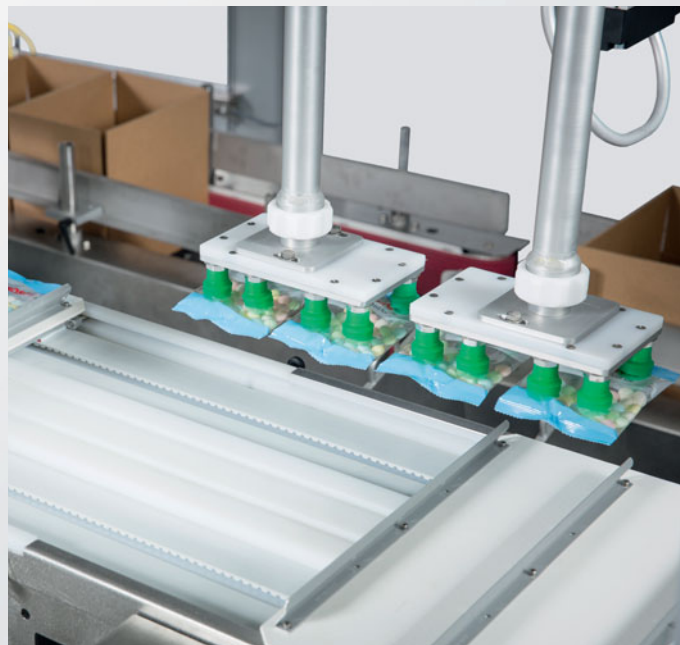
► www.pc-control.net



Koch Pac-Systeme

Modular control technology for compact packaging lines in cleanroom environments.

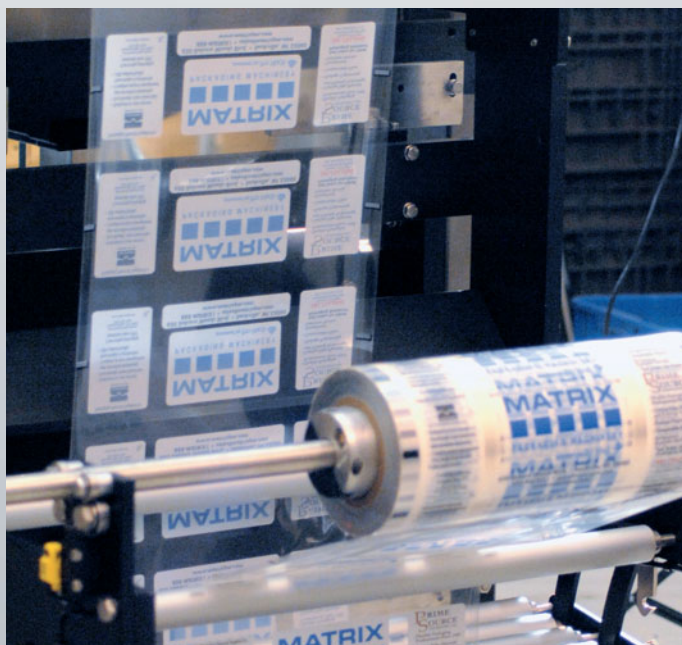
www.koch-pac-systeme.com



Bosch Packaging

PC- and EtherCAT-based technology increases the performance and flexibility of a modular case packing system for the food and candy industries.

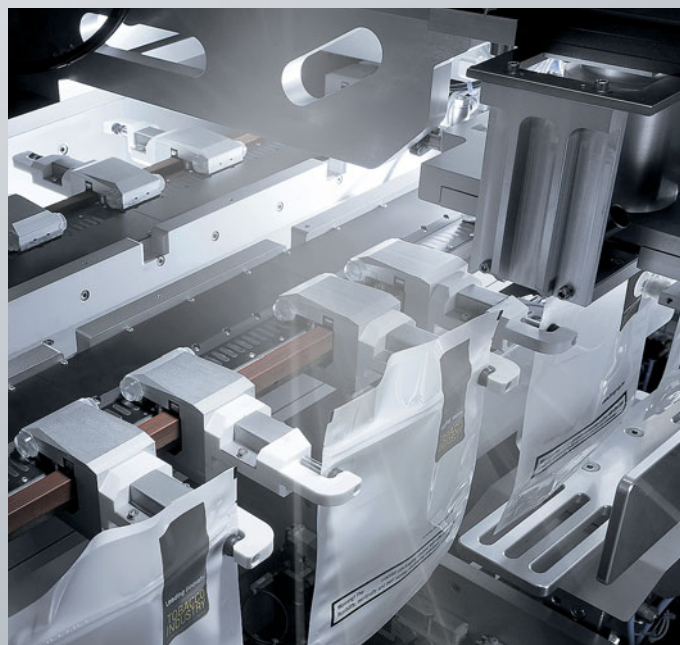
www.boschpackaging.com



Matrix Packaging

AM8000 Servo Drives with one-cable technology save on space and reduce costs in a vertical form/fill/seal machine.

www.matrixpm.com



Technical Development Corporation

One of the first applications based on the XTS Linear Transport System.

www.itmgroup.eu



Galdi

PC-based control meets all the requirements of a modular filling line for milk, dairy products and fruit juices in gable-top cartons.

www.galdi.it



Rohrer

PC-based control solution in a blister packaging machine for the pharmaceutical industry.

www.rohrerag.com



TVI Entwicklung & Produktion

Automation of flexible and precise meat processing centers.

www.tvi-gmbh.de



MULTIVAC Sepp Hagenmüller

TwinCAT robotic kinematics and Servo Drive technology for food packaging applications.

www.multivac.com



Beckhoff – present on all continents

Beckhoff is present in the international market with 33 Beckhoff subsidiaries and many distributors. The company is represented in all major industrial areas in over 60 countries to ensure fast service and support in the local language for its global customers. Beckhoff wants to be not just physically close to its customers, but understand the technical challenges they face down to the smallest detail. A creative corporate culture, enthusiasm for technology and expert knowledge characterize Beckhoff and its partners on all continents.

► www.beckhoff.com



Beckhoff at a glance

- Headquarters: Verl, Germany
- Turnover 2013: 435 million euros (+7 %)
- Staff worldwide: 2,510
- Subsidiaries/Branch Offices in Germany: 11
- Subsidiaries/Branch Offices worldwide: 33
- Distributors in over 60 countries

(April 2014)

More information

- For more information and industry solutions, visit:
▶ www.beckhoff.com/packaging
- To download Beckhoff catalogues and brochures, go to:
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