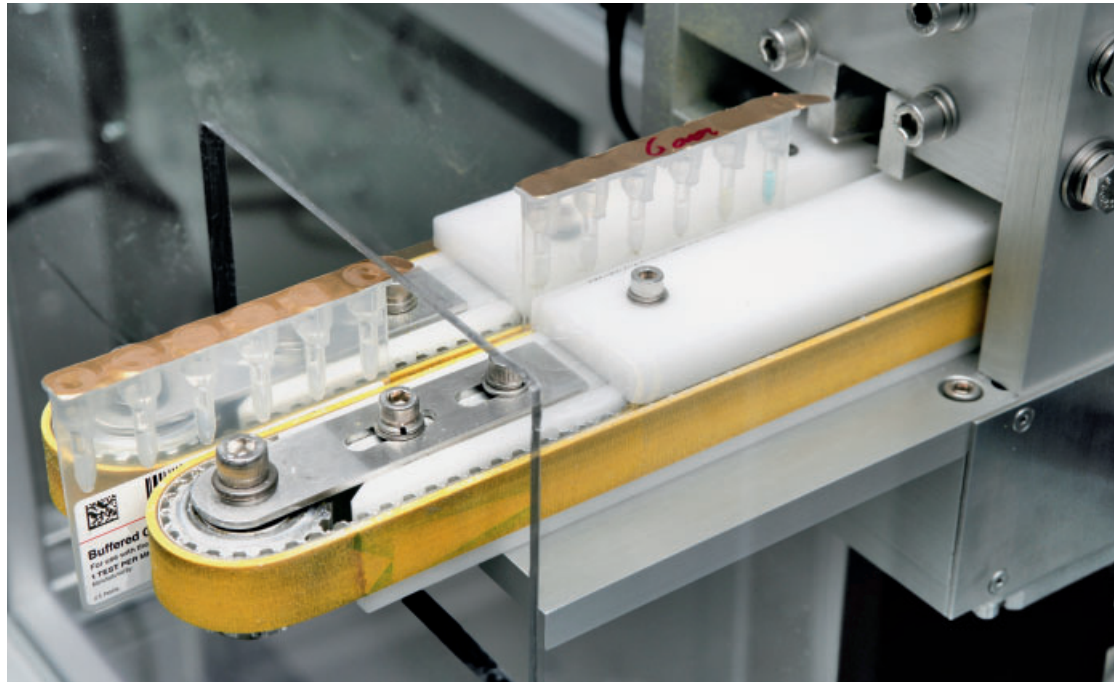


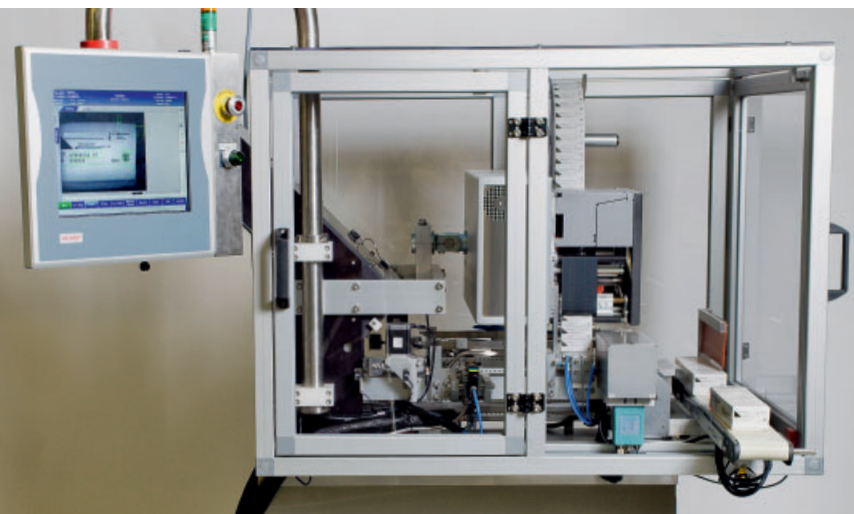
Improving production quality and reducing costs using PC Control

All-in-one Panel PCs for packaging and inspection of blood testing products

Blood testing vials prior to tray erector packaging and labeling. These are rigorously checked by the visual inspection system for fill level, presence of air bubbles, etc.



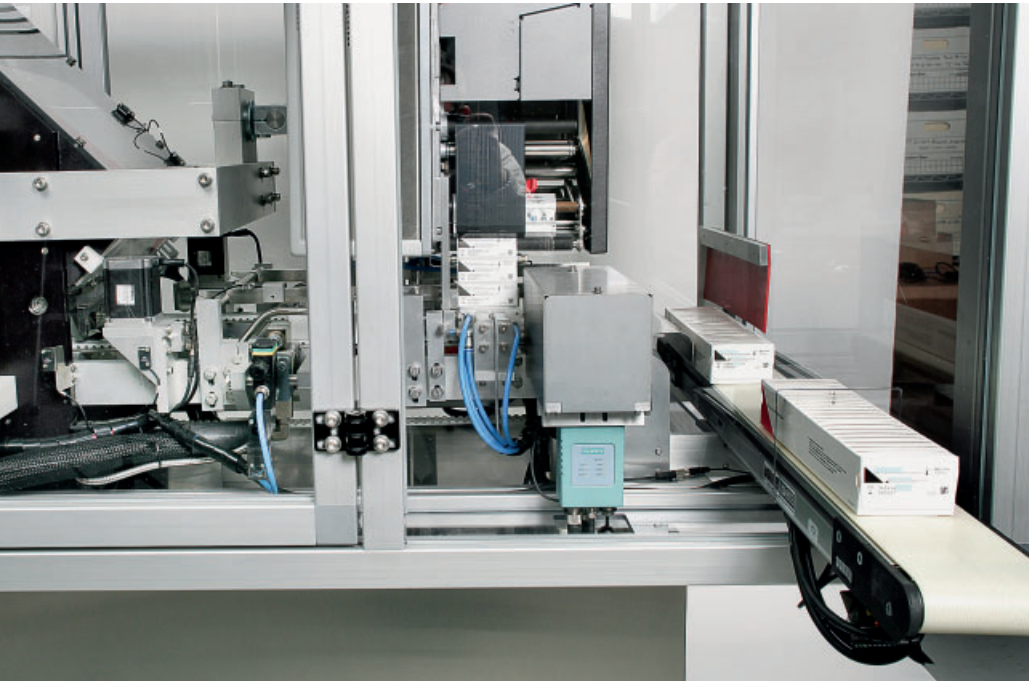
Based in Annandale, New Jersey, USA, Wierciszewski Controls specializes in packaging technologies for the food and beverage industry and pharmaceutical and medical applications. Wierciszewski developed two custom-designed machines to handle packaging and visual inspection of blood testing products for a major medical products manufacturer. The "tray erector" and the "accumulation table" are automated using a PC-based control platform from Beckhoff which meets the exacting requirements for precision and flawless timing.



The tray erector developed by Wierciszewski erects the cardboard trays for packaging the blood test cassettes, prints and applies the labels and performs vision inspection on the applied labels – all on an extremely compact 3-foot by 3-foot floor area.

The blood testing cassettes are filled with a mix of glass beads and reagent which is monitored by the vision inspection system in order to guarantee correct filling, i.e. a proper fill mixture. To enable precise measurement of the fill ratio, Wierciszewski Controls developed an accumulation table with a 4-foot by 4-foot floor space for 600 cassettes and a throughput of 80 cassettes per minute. The accumulation table not only meets the customer's size and speed requirements, but also integrates a vision inspection and reject system. This enables upstream detection of filler and labeler malfunctions so any defective products can be dealt with.

After the tray erector, the cassettes' packaging receives further visual inspection: label placement, optical character recognition (OCR), expiration date and barcode are checked.



The visual inspection requires a PC with HMI to display and analyze the results. The camera has to collect an immense amount of information, such as serial number, bar code grade or fill levels. "In previous systems, the communication speed between vision inspection to HMI and to the PLC was a bottle neck," explained Jerry Wierciszewski, owner of Wierciszewski Controls.

Perfect timing required

The tray erector machine has to tolerate some variability in the trays' raw materials. If there are materials changes, the timing to bend the flaps, fold the cardboard, etc. must change accordingly. The accumulation table complicates the challenge with an in-feed system that has very demanding precision requirements. The conveyor timing must be very tightly controlled when the cassettes are moved through the system to facilitate gentle product handling. "It can be very tedious work to perfect the system timing, but it is a necessity when dealing with blood testing products," Wierciszewski explained. "This made it necessary to move to a new control system."

Reliable recording and logging of all production data

In the United States, the FDA (Food and Drug Administration) requires rigorous electronic record keeping. Both machines therefore have an SQL database for audit trails and detailed tracking for CFR 21 part 11 compliance according to U.S. regulations. As this is one of the highest demands in the packaging industry, especially

in medical applications, there must be a reliable system in place to keep track of all the changes in production and to create detailed reports on these.

Two machines share one Panel PC

As the controls centerpiece, Wierciszewski selected a Beckhoff CP7202 Panel PC with 15-inch touch screen to handle the automation, Motion Control, SQL database and HMI functions for his two machine systems. "The main reason for choosing the Panel PCs with

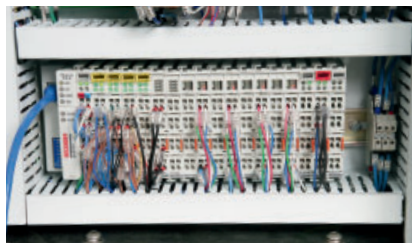
Over a hundred different points are checked by the vision inspection. The results are displayed on a Beckhoff CP7202 Panel PC with 15-inch touch screen display.



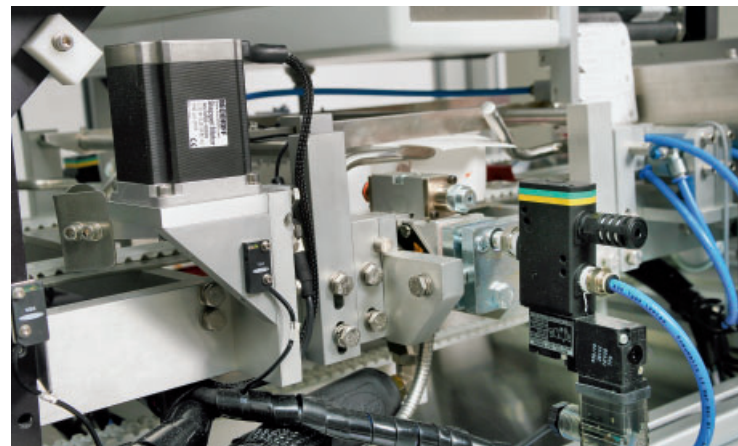


Wierciszewski Controls accumulation table for cassettes used in blood type testing

The I/O Bus Terminals are networked via Ethernet TCP/IP with the Beckhoff BK9000 Bus Coupler.



The stepper motors are connected directly to the Bus Terminal system without any additional amplifier.



TwinCAT PLC software was the requirement for a small footprint. Even greater space savings resulted from the fact that the Panel PC did not require a housing, but is attached to a moveable mounting arm," explained Wierciszewski, adding: "The CP7202 is more than up to the task for the CPU-hungry vision system and the control functions for the two machines. Using TwinCAT ADS, huge amounts of data can be transferred between the HMI and PLC in real-time." Wierciszewski also developed his own HMI software using a Visual Basic .Net and C# platform. "The HMI can communicate very easily with TwinCAT and display visual inspection results, counters and any other system information," he added.

All control components from one source

Due to the limited space, Wierciszewski designed a stepper motor system using Beckhoff KL2541 I/O terminals that are wired directly to Beckhoff AS1050 and AS1060 stepper motors. Integration in the Bus Terminal system dispenses with the need for additional amplifiers.

Wierciszewski networks the Bus Terminals via Ethernet TCP/IP using a Beckhoff BK9000 Bus Coupler. Additional Bus Terminal I/Os are used for relay outputs, motor starters on the conveyor and solenoids, each with 1 amp power consumption. "In the past, we were using separate analog outputs, thermocouple inputs or heating control units from various suppliers. Now all these functions are covered by one I/O system," explained Wierciszewski, listing the benefits.

Time savings and cost reductions add up

From concept to finished machine, the tray erector took about four months. The accumulation table was even faster, taking just two months to design and build. Both machines were fully programmed in only four days.

In addition, costs for the control system and development time were significantly reduced. "Even with the integrated SQL server and comprehensive vision system, the Beckhoff control platform cost is an average of 40 percent less than the devices I used previously," Wierciszewski explained. "Using one Panel PC to control two machines saves considerable time and money. The I/O wiring, which could take several days previously, is now significantly easier using Bus Terminals and Ethernet TCP/IP. In addition, the PC-based control enables remote access to the machine via Internet so that errors can be corrected quickly online."

In the near future, Wierciszewski Controls would like to incorporate high-speed EtherCAT into their machines and use AX5000 EtherCAT Servo Drives to increase performance even further while offering comprehensive connectivity. "Beckhoff has enabled us to plan more efficiently and ensure that our machines deliver ideal performance every time," Wierciszewski concluded.