Press brake manufacturer Accurpress designs flexible, PC-based control system with "on-demand" customization capability

> Press brakes from Accurpress are used for numerous applications in the automotive, aerospace and metalworking industries. Their most advanced press brake, the high-end Accurpress "Accell" offers the greatest precision and speed while maintaining repeat press accuracies and parallelism accuracies of ± 0.01 mm (0,0004"). This is achieved through leading edge, closed-loop servo hydraulics technology controlled by IPCs.

Synchronized Accell press brake with 4-axis Premium backgauge, equipped with Quick-Clamp tooling system for rapid changeover.

Putting the brakes on proprietary controls

In 2001, Canada-based Accurpress began a long-term initiative to upgrade the company's high-end Accel machine line. "At the time the press utilized a controller designed specifically for press brakes. While performance was considered acceptable, high cost and limited programming flexibility were seen as significant obstacles in the way of maintaining the competitive edge in the North American market", explained Accurpress R&D Team Leader Alex Kvyatkovski.

"Most of the competition Accurpress sees in the high-end area comes from Europe," Kvyatkovski said. "That lead us to continue to look closely at European controls providers and do thorough research on emerging trends that fit the Accurpress vision. At the time, no press brake manufacturers were using open, PC-based controls. However, this is exactly the direction that seemed the most promising to Kvyatkovski. "When we came across the PC-based control solution from Beckhoff, we realized that the Beckhoff philosophy was exactly what Accurpress was looking for: With their solution, one CPU could do everything – the entire machine's motion control and run the HMI software," Kvyatkovski said. "This was also much cleaner and more cost effective than the multiple hardware PLC route. The system was also significantly less expensive than the original controller."
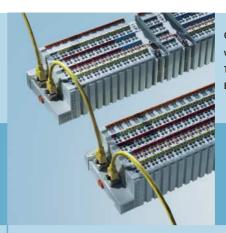
Greater programming flexibility

The finalized Accurpress Accell design features a Beckhoff C6240 control cabinet IPC with a powerful 2.4 GHz Pentium® 4 processor and 256 MB of DDR-RAM and TwinCAT NC PTP software for point-to-point axis positioning. TwinCAT is equipped with an advanced algorithm in which profiles are generated with jerk limitation and with pre-control of speed and acceleration to minimize errors. TwinCAT is also compliant with IEC 6 1131-3 from PLCopen. As the only global standard for Motion Control programming, this gives users the choice of five different languages to write their code. Rugged Beckhoff CP7037 Control Panels with TFT displays are used as HMI interface.

EtherCAT replaces Lightbus

Until recently, the Accell machines had used Lightbus as fieldbus network. "Lightbus is very noise-tolerant and provides fast I/O processing," Kvyatkovski said. "As a progression beyond Lightbus, Accurpress has decided to move to Ethernet-based fieldbus, EtherCAT. This decision was originally driven by a custom application that required faster response times than what conventional fieldbus

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Originally Accell machines were networked via Lightbus. The new machine series uses EtherCAT.

Synchronized Accell press brake with 6-axis Supreme backgauge, Wila crowning device and hydraulic clamping system for tooling and precision front supports.

Synchronized Accell press brake with 6-axis Supreme backgauge.

technology could handle. Since EtherCAT uses off-the-shelf, standard Ethernet hardware and cables, we're confident this approach will be the most cost effective. It will also help make our Accell machines even more repeatable by significantly reducing cycle times", Kvyatkovski said.

With TwinCAT, system extensions are a breeze

A recently added feature on Accell press brakes is the Sheet Follower system. This is a device mounted at the front of the machine that handles materials that are too heavy for an operator to lift. Via an electronic axis, TwinCAT synchronizes the motion with the press and allows Sheet Follower to lift and lower heavy materials safely and precisely. The Accell also features an active angle measurement system – this measures material spring back in the press brakes while the press is in operation. While metal is being formed, TwinCAT calculates bending positions automatically and coordinates the Motion Control to make on-the-fly adjustments without the need for operator intervention.

Never a lost order

"With just one CPU on the machines, the Beckhoff solution is centralized, which saves Accurpress a great deal of money. Perhaps more importantly, it gives us an extremely clean architecture and almost unlimited flexibility," Kvyatkovski said. "Today, Accurpress can quickly, easily and cost-efficiently develop custom features for their customers using TwinCAT software. Accurpress has a very short development cycle when compared to their competitors – often with as little as 2 or 3 months lead-time for major customization requests, enabling us to respond optimally to customer requirements. With an off-the-shelf controller from a 3rd party vendor, this simply would not be possible and several lucrative machine orders would be lost as a result."

"We're seeing an extremely healthy increase in our Accell machine orders. I know we made the right decision in the move to PC-based controls", said Kvyatkovski. "More and more, we find that press brake users are seeking synchronized presses like ours, while traditional PLCs and proprietary designs are quickly losing favor."

⟶ Accurpress **www.accurpress.com**

⟶ Beckhoff North America **www.beckhoffautomation.com**