The Finn-Power Oy, whose machine portfolio for sheet metal processing is marketed under the name Prima Power, is known as a pioneer in fast punching technology. Hydraulic punching machines from Finn-Power exceeded the “magic” 1000 stroke threshold as early as 1993. Based on open Beckhoff control technology, similar production performance can also be realized in servo-controlled punching and bending units: They combine energy-savings and ergonomics with high accuracy and productivity.

Success for Prima Power with PC-based NC controller

“We introduced our first servo-controlled machine back in 1998, and this solution has been going from strength to strength ever since, said Antti Kuusisaari, Product Manager for punching and software technology at Finn-Power. “Servos offer numerous benefits, not least reduced energy consumption. Hydraulic systems run continuously and convert electricity to heat, even when the machine is not in operation. By switching to servo technology we managed to reduce the energy consumption of our machines to one sixth compared with the previous, hydraulics-based models. The connected load of the machine and the main fuse capacity were reduced from 100 A to 25 A. Advanced servo technology also offers excellent options for versatile and exact stroke settings.”
Precisely programmable strokes using EtherCAT
The combined punching and shearing machine, Shear Genius® SGe and the angular shearing machine, Shear Spirit® SGe are equipped with a Beckhoff C6240 control cabinet Industrial PC, TwinCAT NC PTP automation software and EtherCAT I/O. The machine is operated via a customized Economy CP6903 built-in Control Panel with 19” display. “The Beckhoff control solution enables us to adjust the machine configuration online during operation, resulting in a productivity increase of up to 10 %,” said Antti Kuusisaari. The machine reaches a speed of more than 1000 strokes per minute and has a punching force of 30 tons. The strokes are exactly programmable, permitting the rapid implementation of special punching shapes. The controller automatically adjusts the processing parameters to the sheet thickness. A new feature is anticipatory control, i.e. the machine is able to look ahead to the next process step, e.g. stacking of work pieces. In the past the controller only dealt with the current step without taking into account the effects of the next steps.

System-wide configuration software simplifies engineering
Prima Power has one of the most versatile sheet metal processing product portfolios in the world. In addition to machines for punching, bending and laser cutting of sheet metal, the range also includes systems for automating material flows. “The production lines our customers request are complex, with sophisticated configuration, testing and commissioning phases. System-wide application of TwinCAT automation software for configuration and programming of the PLC and Motion Control in all our machines simplifies these processes. The whole system can be installed consistently and more quickly,” said Antti Kuusisaari.

The Beckhoff PC- and EtherCAT-based control system has another advantage for Prima Power: The EtherCAT diagnostics tool make troubleshooting more efficient. “This function is all the more helpful as more machines are connected,” said Antti Kuusisaari. “Machine-based diagnostics would have a much greater impact on machine run-time during troubleshooting.”
Another important feature under today’s production conditions is the simple and system-wide user interface: Where operators are responsible for several machines, switching between workstations becomes easier. Besides, the operators don’t necessarily have to be experts in sheet metal processing, since the machine interface handles many of the calculations.

**Scientific Automation: fast process data acquisition through signal analysis**

Advanced control methods offer scope for the machine to determine suitable processing parameters itself. For example, the first stroke into the sheet metal plate can be measured exactly in the electronic system of the machine. During measurement, the length of the required tool is determined and the most suitable procedure is selected, depending on the material. “This type of process data acquisition through signal analysis is becoming increasingly important. In the future, the working environment for machine operators will become much more complex, while traditional metalworking craftsmanship will become less significant, because the machine itself can master this art,” said Antti Kuusisaari. “EtherCAT facilitates the creation of new machine functions and the extension of existing functions.” The new control system, with its fast and smooth functionality, is also a key factor during tool changeovers. “An integrated tool library reduces to a minimum the times between the individual operations as well as for tool set-up and calibration. The possibility to execute several functions simultaneously reduces the time required and increases productivity.”

Antti Kuusisaari is convinced that Beckhoff offers a global company such as Prima Power another key benefit: “Beckhoff’s global service network means that customers have rapid access to support in their own language, should the need arise.”

Finn-Power Oy  www.finn-power.com/suomi
Beckhoff Finland  www.beckhoff.fi

The E6x automatic work centre from Prima Power, a versatile machine used for sheet metal working, is equipped with a compact automatic loading and unloading unit.