

TwinCAT software offers flexibility and precision

PC-based control for Electrolux production

→ Hestra Automation AB has developed a new cooker component production machine for appliance manufacturer, Electrolux. A technical highlight of the machine is the PC-based control system in conjunction with linear motors from Beckhoff. The flexible control system can easily be reprogrammed to meet future changes in production and therefore meets the requirement of short changeover times.

Hestra Automation, based in Nittorp, Sweden, offers complete machine development from mechanical design and layout to assembly and programming of machines and HMI in innovative and advanced machinery, often with motor control. The company has been a member of the Axelent group since 2005.

As one of the world's major home appliance manufacturers, Electrolux places high demands on its production machines. "Short changeover times between different products are particularly important to Electrolux because they manufacture in small batches and always attempt to maintain the smallest possible buffer stock. Other demands are continuous improvements in quality, speed and high availability", said Andreas Gustavsson, project manager for Hestra Automation. In order to satisfy these requirements, Hestra designed a new method of punching holes in the manufacturing process: instead of using one traditional punch tool, the hole geometries are created through a combination of down strokes from several tools.

This method requires many rapid tool movements, which places extremely high demands on the control system in regard to speed, but also flexibility in programming. With Beckhoff TwinCAT software, a PC-based solution was chosen for this complex punching operation.

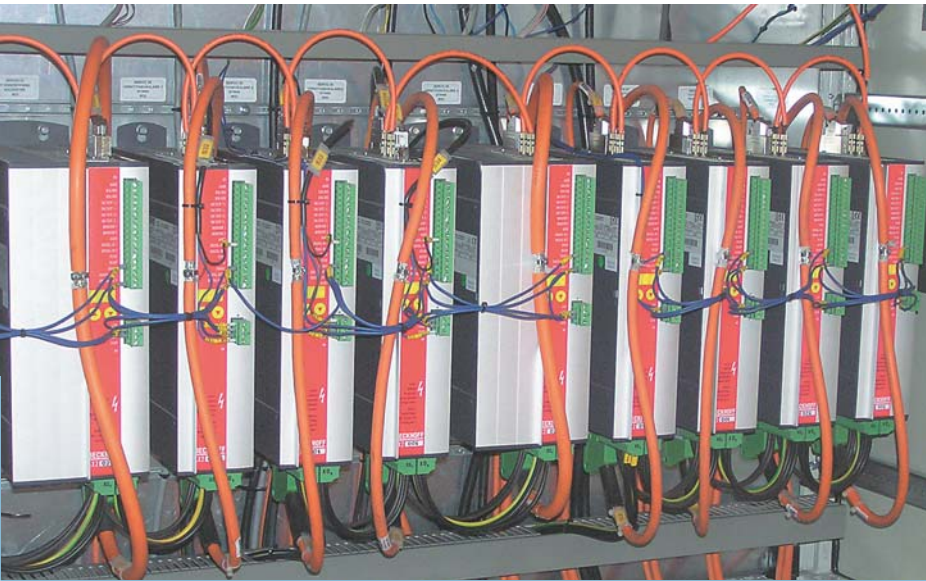
Optimum flexibility with standard components

TwinCAT integrates PLC, NC (including camming), and user interface (HMI). "This is simpler not only in regard to spare parts, but also in terms of programming as all functions are integrated. On account of the integrated camming functionality offered by the TwinCAT NC PTP module from Beckhoff, we have been able to keep the system development time to an absolute minimum and simplify production", said Nicklas Bergh, programmer for Hestra Automation. The machine developed by Hestra includes, among others, six rotating servo motors and three linear motors for tool and punch positioning controlled by the TwinCAT NC. With a PC-based control system, further functionality can easily be added, for example, a CAM preparation function for punch patterns to make it possible to load CAD drawings directly into the control system.

Very high dynamics

Linear motors were chosen to handle the very fast movements required for positioning the punch tool for several reasons. One of the most important character-





istics for punching is high repeat accuracy, in this case 0.02 mm. The dynamic characteristics of the linear motors enable machine acceleration of up to 60 m/s². The axis moves 150 mm in 20 ms including acceleration and deceleration. A standard servo motor can normally offer only about one fifth of the acceleration due to its mechanical construction. A further benefit of using linear motors in this machine is that a water cooling system is not necessary, since the motor design results in very low heat generation.

PC-based solution for new machine concept

For hardware, Hestra selected a C6140 Industrial PC from Beckhoff and a CP6831 15" TFT Control Panel with touch screen. AX2000 servo drives are networked via SERCOS interface. PROFIBUS was chosen for I/O networking and AS-Interface for

specific I/Os and safety signals. The AS-Interface I/Os are integrated directly into the Bus Terminal system via a KL6201 master terminal.

For Hestra Automation AB, the machine developed for Electrolux represents a flexible solution with further application well into the company's future. It evolved into a very compact and economical machine, and due to the open PC-based control system from Beckhoff, it can easily and quickly be adapted and reprogrammed for other similar processes.

→ Hestra Automation AB www.hestraautomation.se

→ AB Electrolux www.electrolux.com

→ Beckhoff Schweden www.beckhoff.se