

Modular deburring machine with a touch-panel PLC

Sascha Christmann

Author

Sascha Christmann
Technical support
Pro-Face Deutschland
GmbH
Albertus-Magnus-Str. 11
DE-42719 Solingen

Links

www.proface.de
www.ernst-maschinen.de

Machine builder

Paul Ernst is a mid-range machine tool manufacturer with 60 employees and an export share of over 70 %. The company provides development, assembly and service for its deburring machines for sheet metal as well as sanding machines for the furniture industry. The technical solutions are based on a modular machine concept to match customer requirements.

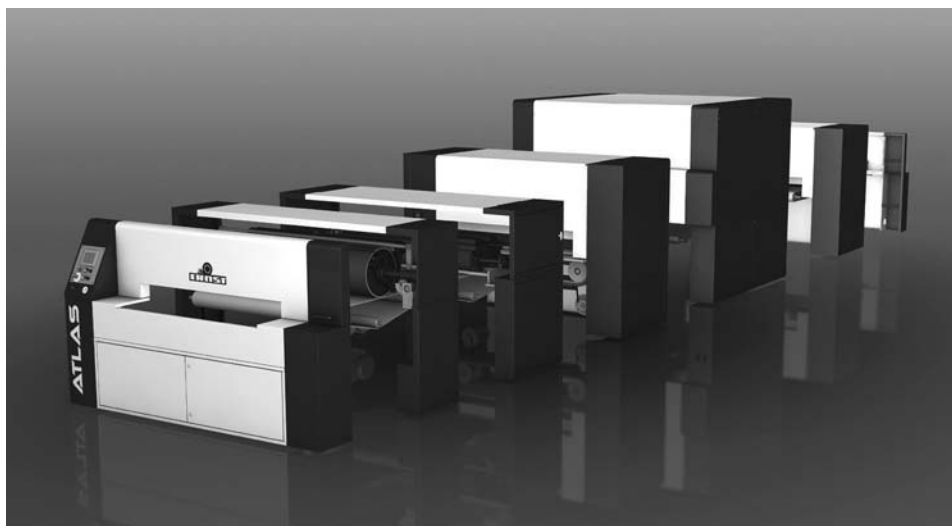


Figure 1: All modules of the Atlas series by Paul Ernst

Burring and surface treatment of metal plates are the tasks of the Atlas (dry treatment) and Neptun (wet treatment) machine generations by Paul Ernst Maschinenfabrik. The modular design concepts and division into specialized functional units enable burring-task to cope with the actual customers' and users' requirements, which are subject to constant change. Currently offered are deburring, brushing, brushing cross, rotor and grinding modules. The appropriate treatment process and the demands of

end users determine which modules are actually selected. The customer may extend his machine with units from his own stock or newly added modules and thus offer new machining processes. The uptake of new technologies into the program, such as an engraving

module, is possible through retrofitting, making investment costs for new equipment omit.

"Regarding the design process since early 2009 we consequently standardized all mechanical, pneumatical and electronic interfaces between the var-

“ The development tool GP-Pro EX supported our great ideas for the modular machine concept, it is transparent, fast and efficient in usage. **”**

Dirk Zimmermann

ious functional units," said Dirk Zimmermann, Technical Director at Paul Ernst Maschinenfabrik.

Central control unit

"In selecting the central control unit of the machine, including the operator termi-

nal and the peripheral I/Os, we made use of the positive experiences of our sister company Jumag Dampferzeuger, who are successfully using Pro-Face products for quite some time," meant Dirk Zimmermann.

The use of Autodesk Inventor 3D CAD software in combination with the control components from Pro-Face enabled the modular approach in the machines mechanical and electrical construction as well as in the machines software. The central control unit in the system is the Touch-PLC AGP3300 by

Pro-Face. This hybrid device acts as the controller (PLC) for the various machine functions. It communicates with the functional units via CANopen. The serial bus approach allows the changing or upgrading of the machine configuration by docking the functional



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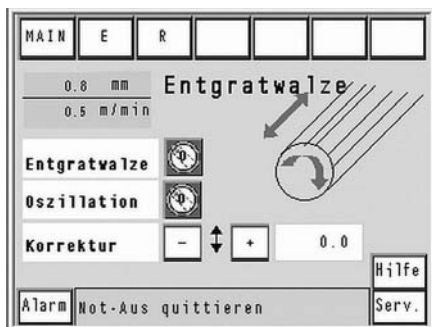


Figure 2: Setting of preferences for the burring process via the touch-panel

units. Also electrical safety is taken into account, as the only electrical connections between the machine modules is the CAN network and the operating voltage (24 V and 400V). Regarding the CANopen interface, the controller complies with the according specifications as defined by CAN in Automation (CiA).

The touch-panel integrates also a USB interface. Service functions (e.g. backup and update the entire configuration data or backup of displayed alarm and system messages) may be integrated. These start automatically by means of a pop-up window or self-automated functions when a USB flash drive is connected. Through this feature, the exchange of data (e.g. via email) and quick failure analysis is possible from nearly all over the world. The individual configurable user (or user group) levels are adjustable by a provided password-management.

Software solution

CANopen-Configurator integration software by Pro-Face provides a drag-and-drop interface for single (relies on single EDS files) and modular type devices (with modular EDS files). The software fulfills importing and interpreting of EDS (electronic data sheet) files as well as handling of EDS files, with "slight" errors, e.g. wrong manufacturer code. After implementing the EDS file, the user has to name the PDOs (process data objects) and may start design-

ing his GUI (graphical user interface) getting required PLC functionality. Optionally SDO (service data object) communication may be created within the software.

Pro-Face provides different types of CANopen connection – either being NMT slave in a master-driven network or being the NMT master itself. The manufacturer offers the HTB terminal with high-speed counter functions or PWM capabilities and the EXM modules (attachable to HTB) offering such options as analog in-/outputs, relays or temperature probe inputs.

The development software GP-Pro EX covers the aspects of project development and active work. The tool is suited for both the design and configuration of the user interface as well as the programming of the PLC. The combination in one software package results in a time-saving solution as no time is lost for switching between applications and workflows. The unified data-base allows access to all relevant project data offering drag-and-drop functionality for efficient working. "Also, other peripherals, such as frequency and position sensors, were easily integrated with the CANopen NMT master of the AGP3300," added the Technical Director.



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Contact: +49 345 / 7 77 55 0
 port GmbH +49 345 / 7 77 55 20
 Regensburger Str. 7b service@port.de
 GERMANY – 06132 Halle/Saale www.port.de