Beckhoff Industrial PC C6140 controls processing centers

A technically elegant solution

Vignotto S.r.l., based in Gozzano, Italy, has been producing special machines and transfer devices for fitting manufacturing applications since 1971. The company's corporate philosophy is based on meticulous design, simple construction and high quality standards. The change-over to PC-based control systems with Beckhoff technology led to greater flexibility as well as time and cost savings.





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General view of the transfer device

The services offered by Vignotto S.r.l. include design, machine construction, planning and implementation of electrical and oil-hydraulic systems, as well as writing software for processing centers. All components are manufactured in-house on CNC machines. This production technique guarantees a uniform, high level of quality. CAM (Computer Aided Manufacturing) enables fast and direct implementation of computer models for actual production.

Transfer devices and robotic cells for mechanical machining

The transfer devices consist of a rotary table with multiple stations and vertical or horizontal axes with a fixed or relocatable/tiltable processing head. Through the combination of these components, a wide range of production cycles for mechanical series production can be configured.

In addition, Vignotto installs robots and robotic cells for automatic feeding of workpieces to transfer devices and processing centers. The robots are controlled visually via a video camera that monitors the position and alignment of workpieces on the conveyor belt.

Inefficiency and complex wiring lead to changes

The transfer device requires a wide range of inputs and outputs for controlling the NC axes. A machine with 12 processing units for manufacturing fittings (mixers/taps), for example, requires a system with approximately 150 digital I/Os and 16 analog outputs for controlling spindle speed and 17 NC axes.

In the past, a PLC with interface cards (each controlling 4 axes) was used for the connection with the NC units, which meant that the NC environment was not very flexible: If an additional axis was required, for example, a complete unit consisting of 4 axes had to be added, making expansion rather costly and inefficient.

Furthermore, the wiring between the NC units and the PLC (encoder and drives) was complex and the installation and switch boxes required a lot of space, which often led to problems on site. In addition, different programming environments were used for PLC and NC so that different software programs and hardware interfaces were required for commissioning the systems.

Flexibility is the solution

For these reasons, Vignotto decided to use flexible PC Control technology from Beckhoff: The system is now controlled by a C6140 series Industrial PC with CP6831 Control Panel, 15-inch TFT monitor and extended keyboard using Windows XP operating system and an FC7502 SERCOS interface card.

According to the company owner, H. Giovanni Vignotto, the key aspect of the Beckhoff solution is uniformity of the assemblies, which optimizes the configuration – digital or analog I/O Bus Terminals with 2, 4 or 8 channels and a wide range of Bus Couplers, including the BK7520 with SERCOS interface can be used.

On the software side, TwinCAT NC PTP integrates PLC and NC functions, as well as the programming environment. TwinCAT delivers maximum versatility: Adding 1 axis no longer requires costly hardware involving 3 or 4 unneeded axes, but can be achieved with simple installation of the encoder module or wiring of the additional drive. Maintenance costs are also reduced significantly: In the event of a fault, only the affected module has to be replaced, not the complete NC unit for 4 axes.

The SERCOS fieldbus makes wiring between the different parts of the I/O system and the drives quick and straightforward. The encoder units are installed at the machine. Instead of expensive wiring with plug connections between the machine and the control cabinet, a two-core optical fiber cable is sufficient for connecting the encoder directly with the switch box. The space requirements for the installation are also reduced significantly. "The Beckhoff solution enables not only the realization of an integrated system within a uniform environment, it also offers maximum flexibility as well as time and cost savings for wiring and maintenance," Giovanni Vignotto concluded.

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