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PC-based control enables an open and scalable CNC solution which is ready for Industry 4.0

Flexible CNC solutions scale from compact to high-end, extend to the Cloud

PC-based control technology from Beckhoff covers the entire spectrum of high-precision CNC applications. From extremely compact to highly complex solutions, all solutions can be implemented to a fine scale – leveraging an open, integrated hardware and software platform, and complying with all requirements for future Industry 4.0 concepts today.

The PC-based CNC represents an extremely high-performance solution – the significant processing power of the hardware, in conjunction with efficient TwinCAT software and fast EtherCAT communication technology, enables short cycle times and high precision. Up to 64 controlled axes/spindles, a maximum of 12 independent channels, up to 32 simultaneously interpolating axes/spindles per channel, and high-end CNC features such as High-Speed Cutting (HSC), spline interpolation or coordination, and kinematic transformations can be realised, among other valuable functions.

All of this can be scaled as required with regard to processing power and complexity – as a flexible and cost-optimised solution for the entire range of systems from a machine manufacturer, from standalone machines to highly complex production lines. This high scalability comes as a result of the flexible TwinCAT software platform for engineering and runtime, the broad IPC spectrum from the Intel® Atom™ processors up to many-core control systems, and the comprehensive I/O portfolio for all signals and fieldbus systems. In addition, the highly dynamic servo technology, also available in

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compact terminal format, as well as system-integrated safety solutions, add to the high level of scalability.

PC-based openness as the ideal foundation for Industry 4.0

PC-based control has always combined the advantages of automation and IT technology, and therefore already provides the ideal basis for the implementation of Industry 4.0 strategies. Features such as Big Data, Internet and Cloud services can be easily supported because the required interfaces are already integrated into the system. Therefore, PC-based CNC opens up vast innovation potential for Industry 4.0 scenarios, enabling such advancements as modular and dynamically-configurable machine tools. Internet and Cloud-based services also create new business opportunities, e.g. for diagnostics and process optimisation, or in the form of new business and operator models.

The open PC-based control architecture also enables extreme flexibility in engineering, as TwinCAT 3 automation software enables the use of IEC 61131-3 and C/C++ or MATLAB®/Simulink® programming tools for real-time applications, according to customer requirements. In this way, a customer-specific transformation can be written in C++ and easily integrated with the CNC. Microsoft Visual Studio® serves as convenient platform for the configuration, programming, and diagnostics of TwinCAT modules, ensuring seamless integration with the configuration. This includes protection of intellectual property, as well as the inclusion of all tools needed for efficient software creation. All in all, this results in solutions that are based on established industry standards, into which third-party components can be added easily as required.

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Universal hardware, software and industry expertise

With PC-based control, all automation and CNC tasks can be solved using one hardware and software platform. This provides clear efficiency benefits and best-possible usability. In addition, TwinCAT 3 software integrated with Microsoft Visual Studio® provides a unified environment suitable for engineering, runtime, commissioning, and for all control functions ranging from PLC, CNC, condition monitoring to measurement technology. Furthermore, EtherCAT, as an extremely efficient and universal industrial Ethernet technology standard, is ideal to handle communications for everything from individual machine tools to entire production plants.

Due to the comprehensive CNC application knowledge behind the solution, additional industry- or customer-specific CNC functions can be quickly implemented upon customer request. This not only results in shorter time-to-market, it also drives innovation, enabling process optimisation and effective protection of intellectual property.

→ www.beckhoff.com/CNC

Press picture:



Picture caption:

PC-based control provides efficient, flexible, and scalable CNC solutions for the entire spectrum of CNC applications.

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