Interview with Hans Beckhoff about EtherCAT P

With One Cable Automation, machines can become fully modular

EtherCAT P combines high-performance communication and power supply in a single cable for One Cable Automation across the entire field level. In this interview, Managing Director, Hans Beckhoff talks about the concept of plug-and-play automation, its concrete benefits, and its impact on modern machine design.

What were the main reasons for developing EtherCAT P?

Hans Beckhoff: On the one hand, as a high-tech company, Beckhoff has always been one of the first to recognize and master new technologies. On the other, we have never neglected the practical aspects of machine and building automation because we also build our own control cabinets, among other things. Particularly in machine design, we have seen for several years now the trend of reducing the number of cables. They are not only expensive; they also take up a great deal of space and are a potential source of errors. Even the development of fieldbus systems many years ago was a response to this problem. This trend is furthermore confirmed by developments in IT such as USB and Power over Ethernet as combined communication and power connections. With EtherCAT P we have once again brought together the worlds of IT and automation, which is the underlying philosophy of PC-based control.

What special requirements does EtherCAT P meet as an industrial one-cable solution?

Hans Beckhoff: Many automation devices require two voltages so that inputs and outputs can be switched separately, and many require a higher supply voltage as well. In addition, most machines integrate large numbers of automation devices, which is why an industrial one-cable solution must be cascadable. Since the IT world offers nothing that can fulfill these requirements, we developed EtherCAT P. It combines ultra-fast and flexible EtherCAT communication with the standard industrial voltage over a standard 4-wire Ethernet cable. As a result, automation devices can be supplied with data and two times 24 V/3 A via a single cable and a simple M8 connector.

What does EtherCAT P mean for PC-based control?

Hans Beckhoff: EtherCAT P is an important step towards simpler system architectures. Customers can use their existing know-how to quickly put the benefits of the available 24 V EtherCAT P technology to use. In addition, EtherCAT P has already been published within the EtherCAT Technology Group (ETG), and standardization specifications are currently in the works. Our goal is to establish EtherCAT P as an open technology standard the same way we did very successfully with EtherCAT.

What target industries are you addressing with EtherCAT P?

Hans Beckhoff: EtherCAT has proven itself as a universal technology that is being used in many industries. It is employed in machine and building controls, measuring technology applications and audio transmissions. We believe that EtherCAT P is a logical extension of EtherCAT that makes it easier to design whole systems. Accordingly, it will be implemented in the same fields. Machines will surely be a major field of application, but people also view EtherCAT P as a major opportunity to simplify the automation structure in buildings. The measurement technology field will benefit most of all from the fact that only a single M8 connector is needed to link intelligent sensors, which will make these systems more compact and easier to integrate.

EtherCAT P is the basis for One Cable Automation. What is the basic idea behind this concept?

Hans Beckhoff: Beckhoff introduced One Cable Technology (OCT), which combines communication and power transmission, with great success in the field of drive technology four years ago. It has been a driving element in our product development activities ever since. EtherCAT P places this principle into a more general context by extending One Cable Automation to the field level. It is based on the idea of a plug-and-work technology so that an automation device can be integrated into an automation system by simply plugging it into

"Because of its easy and cost-efficient implementation and ease of use, EtherCAT P will become a global standard in automation – just like EtherCAT has."

Managing Director, Hans Beckhoff

the appropriate socket. Another goal is to have plug-in automation in the machine, where intelligent EtherCAT sockets in the machine combine the different voltage levels with the respective communicative intelligence. We have defined a complete EtherCAT P family of connectors that cover the entire range from 24 V/3 A to 600 V/64 A.

What does plug-in automation or the elimination of control cabinets for machines mean for the future of mechanical engineering?

Hans Beckhoff: Modern machine engineering concepts always include modularization, i.e. developers think in terms of platforms and modules that are based on these platforms. By combining these modules they can design a customer-specific machine with minimal effort. Needless to say, they would like the control logic to be just as modular as the mechanical systems. This applies to the signal level as well as the software architecture. Accordingly, machine developers want the small part of the control cabinet that handles a single machine module to be part of this module in the form of a compact IP 65 solution and not something that requires a separate installation with its own engineering and wiring requirements. EtherCAT P is the ideal solution for connecting such modules. If the design includes the EtherCAT P connector system as well, automation devices can be simply plugged in to make them work.

What innovative machine and system designs does this make possible?

Hans Beckhoff: This plug-in capability will have a significant impact on two levels: when connecting complete machine modules and when connecting automation devices via EtherCAT P sockets. At the end of the day, it will be possible to supply the entire machine via a central power and communication station, which opens the door to clearly laid-out, modular and easily expandable machine designs. In addition, EtherCAT P will entice machine designers to think in more modular terms due to its cost-effectiveness, ease of application and its very plausible underlying philosophy.

What EtherCAT P products does Beckhoff already have in its portfolio?

Hans Beckhoff: By the second quarter of 2016, all EtherCAT Box modules will also be available in EtherCAT P versions. This will give us an extremely broad I/O portfolio for nearly all signal types that can be used with the existing engineering know-how while eliminating the need for separate power supply lines. EtherCAT P-capable 24/28 V servo drives with add-on power electronics will become available in the second half of 2016. We are also planning a Panel PC series that can be connected very elegantly and at low cost via a single EtherCAT P M8 connector. Over the medium term, we will cover the higher power range with infrastructure components and EtherCAT P sockets as well.

What benefits does EtherCAT P deliver in terms of Industrie 4.0 and/or the Internet of Things?

Hans Beckhoff: The Industrie 4.0 concept in particular requires you to collect and analyze a multitude of signals, for which EtherCAT P provides the ideal sensor, actuator and measurement technology bus. Corresponding IP 65 I/O modules will make it easy for the user to place measuring points wherever they are needed and forward the data to the Internet of Things via protocols like AMQP or MQTT. With TwinCAT IoT and TwinCAT Analytics we are already offering ideal solutions for such applications today.

Author: Stefan Ziegler, Marketing Communications, Beckhoff

Further information:
www.beckhoff.com/ethercatp