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High speed – low risk

When we talk about "high speed" at Beckhoff, we generally refer to fast EtherCAT communication, fast PC-based controllers, and eXtreme Fast Control (XFC) technology. However, in the case of the new EJ Series EtherCAT plug-in modules, the reference points toward higher speed in terms of control cabinet construction.

The inherent flexibility found in the single-core wiring of all components is unmatched, but tends to be rather "low speed", due to the manual labor-intensive nature of the processes. Steps taken in the past to reduce control cabinet construction time include: using spring-loaded connection technology instead of screw terminals, automatic potential distribution in I/O and drive systems, CNC milling and drilling portals for machiningimproved interfaces between automation software and circuit diagram editors, such as TwinCAT ECAD Import. Nevertheless, despite these measures, wiring and inspection of the completed control cabinet remain time-consuming tasks.

The new EJ series of EtherCAT plug-in modules from Beckhoff allow the company's proven and extensive I/O product range to be used on circuit boards. With this new offering, all production steps, from PCB manufacturing to population to inspection, can be executed with a high degree of automation, a decided advantage for manufacturers in search of more efficient operation. Any connection types can be implemented on the circuit board in the form of interfaces. This means that only the required connection elements need be selected, such as in the case of prefabricated cables with coded plugs. Users can basically "Plug & Work" with their control cabinet.

Streamlined manufacturing processes, the elimination of most wiring error risks, and cost reductions from reduced installation time are just a few of the benefits gained through the new EJ series. In addition, production can take place at different locations worldwide with minimal risk, as errors are avoided by automating production processes and coding the devices independently of the employee qualification, removing skills-gap concerns.

The basic PCB, or so-called distribution board, assumes the following functions:

- acceptance of the EtherCAT plug-in modules
- optional protection against incorrect connection via EJ module coding
- routing of the signals and supply voltage between EJ modules and application-specific connection elements
- optional auxiliary functions, such as coupling relays

The distribution board is designed in one of two ways: either by the user or through custom development by Beckhoff. A corresponding design guide is also available.

As "EtherCAT Terminals for circuit boards", the EtherCAT plug-in modules extend and optimize the range of uses in mass-produced standard machines; there, the expense of developing and manufacturing the distribution board quickly pays for itself. These modules also provide more options to efficiently use modular I/Os in applications such as the semiconductor industry. The "copy exactly" philosophy can be implemented directly into the controller, as demanded by Intel and other semiconductor manufacturers.

More information regarding the new EJ system can be found on page 14. Additionally, interested parties can visit the Beckhoff booth at the SPS IPC Drives 2014 in Nuremberg, Germany to discuss possibilities for their standard machine with Beckhoff experts.