Smart Identity System connects ERP and shop floor

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This Smart Identity System provides comprehensive remote connectivity, enabling users to access applications via web-capable devices like smartphones and tablets.

This tells of turnkey labelling and marking solutions that raise efficiency and save money. The development of innovative labelling and marking solutions is one of the main undertakings of C3 Corporation (referred to in this article as the Company). Based in Appleton, Wisconsin, the company recognised at an early stage that intelligent track-and-trace is the key to intelligent manufacturing. Equipped with PC-based control technology, the Smart Identity System developed provides comprehensive remote connectivity, enabling users to access applications via web-capable devices like smartphones and tablets.

The company's track-and-trace systems are used in many industries like foam and urethane production, the paper and packaging industry, the food and beverage industry, as well as in the finished metal products industry. Working closely with customers, the company has a need to understand the entire operation from the shop floor to the top management level and everything in-between. This enables the elimination of bottlenecks, making the whole operation more efficient.

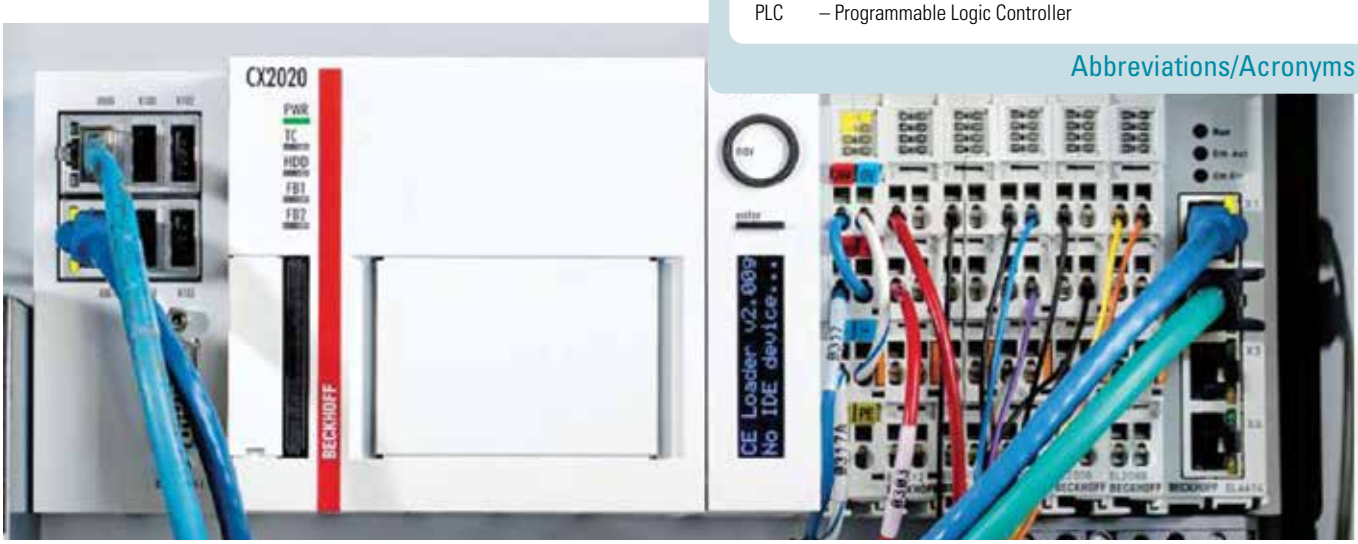
With the company's Smart Identity System for marking products with data-intensive labels, it has managed to introduce a new development in the field of integration services. This system gives customers an accurate overview of their operation's throughput rates and effectiveness. Via remote access they can use any web-capable device to issue commands, change templates and labels, run diagnostics and access data. The openness of the PC Control platform also allows us to adapt our labelling and marking solution to the customer's specific requirements.

PC-based control:
Integrated, highly-connected control platform

The control platform of the Smart Identity System consists of a Beckhoff CX2020 Embedded PC with a 1,4 GHz IntelR CeleronR CPU, TwinCAT 3 automation software, and EtherCAT as the real-time communication system. The Embedded PC, with its directly connected EtherCAT I/O terminals, allows us to design the system with great flexibility. This is a huge benefit, because all our applications and installations are customer-specific. The PC-based control solution also enables optimal vertical and horizontal integration. For example, linking to an ERP system is just as easy to implement as it is cost-effective. The controller's connectivity allows you to link it to the Worldwide Cloud and access it via mobile devices from anywhere as long as the customer's network is VPN-capable. The company has also begun to implement OPC UA so that users of Smart Identity Systems can see the same data at the same time with built-in security and data encryption. Based on PC-based control technology we implemented a web server, a comprehensive database and a controller in a single device.Conventional systems cannot compete with this solution because they require multiple hardware layers or separate devices. With PC Control we simply add more software layers, combine everything in a single hardware device, and sell the solution as an all-in-one, turnkey package.

CPU – Central Processing Unit
ERP – Enterprise Resource Planning
I/O – Input/Output
OPC UA – Open Platform Communications Unified Architecture
PC – Personal Computer
PLC – Programmable Logic Controller

Abbreviations/Acronyms



Automation technology and IT convergence via TwinCAT 3

TwinCAT 3 plays an important role in the labelling and marking solutions from C3. In addition to the standard programming languages for automation applications, TwinCAT 3 offers a wide range of IT engineering tools. The development software, the easy installation of web servers and a series of new software tools give us many options to further advance the functionality of our Smart Identity Systems. As a result, we can embed many functions at no additional cost into the PC-based software platform, which makes the work of our developers considerably easier. The TwinCAT 3 software libraries make it possible to implement one or more TCP/IP servers and/or TCP/IP clients within the TwinCAT 3 controller. The controller variables and/or the direct values from the EtherCAT I/O system can be recorded and saved in databases cyclically or in an event-driven manner. With the TwinCAT 3 Database Server, the company was able to significantly expand the history tracking and trend analysis functionalities. We can see all the labels and the markings throughout a line, and it is rather easy to view what a facility has produced by the day, month or year. The company uses a variety of digital EtherCAT I/O terminals to connect sensors, scales, scanners and other field devices. EP6652-0010 EtherNet/IP slave terminals handle the communication with other industrial Ethernet systems. They provide a direct link to EtherNet/IP devices in the company's applications and return their data via EtherCAT.

Open Platform Communications Unified Architecture (OPC UA) is an industrial M2M communication protocol for interoperability developed by the OPC Foundation.

Power through intellectual property

The company recently installed the new PC-based Smart Identity System for a highly automated national dairy processor client. This company can now gather data about its recipes and improve their traceability. In the previous system, the main PLC sent requests to a computer, which then sent the print commands to the label printer. The issue was time. Since a single computer controlled all the labellers, a boxed product would frequently be missing a label because it was not printed on time. Consequently, the product had to be sent back through the system to be properly labelled. EtherCAT allowed us to increase the labelling speed significantly. The real-time communication system makes sure that all labels are correctly printed by the time each package arrives for final processing. It also gives the company access to its entire production history. Another advantage of the PC-based solution is the system's source code protection. This solution allows the customer to protect valuable intellectual property. The hot-connect capability of EtherCAT also made it much easier to switch out print engines and consumables. These processes could take four hours or more on the plant floor if you include the IT department's involvement with the ERP systems. With PC-based control and EtherCAT, it now takes one person just about half an hour.

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