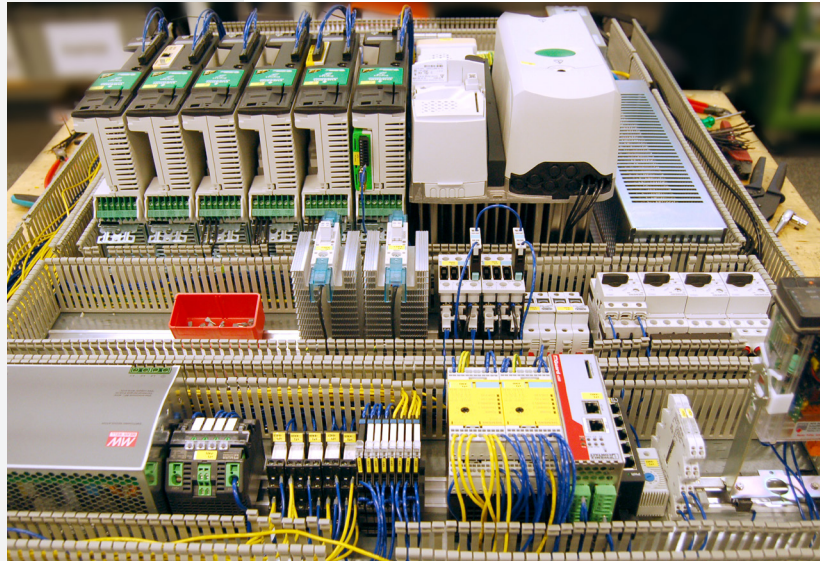




*Zuken's software solution
for electrical wiring,
control systems and fluid
engineering.*



Pantec Automation cuts machine manufacturing turnaround time by around 50%, reduces product costs, and helps protect IP for its customers, using E³.series

"Through using E³.series we have realised immense operational efficiencies in-house and saved costs, plus we have also helped our customers be more efficient and competitive in their markets."

Markus Hanefeld,
Sales Manager,
Pantec Automation



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When Pantec Automation's customers faced pressure from low-cost counterfeit machinery, they realised the best way to fight back was to help customers reduce their own costs. Through wholesale efficiency improvements achieved by expanding its use of Zuken's E³.series and integrating it into its ERP/PPS, Pantec Automation enabled its customers to better serve end-users.

As well as meeting cost-reduction goals, the company reduced the time from order placement to delivery of the fully assembled electrical equipment from an average of 15 to eight weeks – a massive cut of around 50%.

Headquartered in Liechtenstein, where it has its R&D and production centres, Pantec Automation trades internationally and its capabilities include software and hardware engineering, switchgear construction and test, and full lifecycle management. Its products include Human Machine Interface (HMI) systems and switchgear units for driving motors and actuators.

Pantec Automation's customers are OEMs of highly automated machines used in industries such as food processing, pharmaceutical, in textile and paper mills and on automated assembly lines. These OEMs typically have just a few different machine types which they then custom-build to meet their customers' requirements. The builds are mostly unique, as the specifications (such as physical dimensions, roller speeds, or number of encoders or other sensors) will be set to meet the requirements of a particular plant or factory.

Machine complexity, or rather machine *uniqueness*, presents a challenge at the best of times – but Pantec Automation's customers are facing another more pressing problem. Markus Hanefeld, Sales Manager, explains: "Many of our customers' markets are now being served with lower-cost and lower-quality foreign imports, which was always a danger because some of the countries they sell to, where manual labour is very cheap, also have a reputation for copying."

The best way to minimise the risk of copying is to make the machines better value-for-money; i.e. lower cost. Machine builders can also become more competitive by reducing their delivery times. Accordingly, Pantec Automation set about identifying ways in which it could reduce costs and help the machine builders engage more efficiently with their customers.

Results

- Up to 50% reduction in machine delivery time
- Machine quotes supplied within days rather than weeks
- Greatly reduced IP risk: OEM machines are less likely to be copied if they cost less
- Modularity achieved by managing options and variants through a decision tree within a configurator tool
- 95% of project work goes straight to assembly specialists with no design engineering intervention: quality and data is policed by E³.series
- Results achieved using existing E³.series setup at no extra cost



Pantec Automation, a business unit of Pantec Engineering AG, is a leading designer and manufacturer of control systems for machines with a high level of complexity.

E³.series is a Windows-based, scalable, easy-to-learn system for the design of wiring and control systems, hydraulics and pneumatics.



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Modularity leads to efficiency

Until recently, the development and build of a machine for a plant used to be an engineering (design) intensive and time-consuming task for both the machine builder and Pantec Automation. For instance, when liaising with a customer the machine builder's salespeople were, and continue to be, learning about the customer's requirements.

They then needed to consult with engineers in their offices to determine if and how the exact requirements could be met. Once the requirements were established, Pantec Automation would then quote for the provision of the control cabinets, HMIs and cabling; which would need to be done before the machine builder could provide its customer with a quotation.

In this respect every engagement was like a new, standalone project involving several three-way communications. Also, from Pantec Automation's perspective, when an order came through, its assembly people then had to build the control units, HMIs and cables for the machine. However, for them to do their work the engineers first had to modify the electrical schematics and accompanying documentation; something that would not have been worth doing before the order was placed.

Hanefeld notes: “Our engineering costs are high because of the regional standard of living and salary expectations. This meant cost reductions had to come through greater efficiency, which in turn would have to be realised through making better use of our tools. Modularity played a key role. We all had to move away from every project being such a drain on engineering resources.”

It was recognised that one of the tools with the potential to play a far greater role in Pantec Automation's revamped processes would be Zuken's E³.series; which Pantec Automation had been using solely for electrical schematics and cable drawings.

Through tighter integration within Pantec Automation's IT system, E³.series began playing a crucial role within a 'Configurator' tool the company built for its customers (the machine builders) to use when talking to their customers. The Configurator presents a list of valid variants and options. “And that had been part of the problem before – validity,” recalls Hanefeld. “It required engineering knowledge to understand which parts of a machine could work with other parts.” Hanefeld goes on to draw a simple analogy with the choices available when choosing a new car: “There might be coupe and convertible model variants, but in terms of options a sunroof would only be available on the coupe.”

The screenshot displays the ZUKEN Configurator interface with several sections for selecting options and variants:

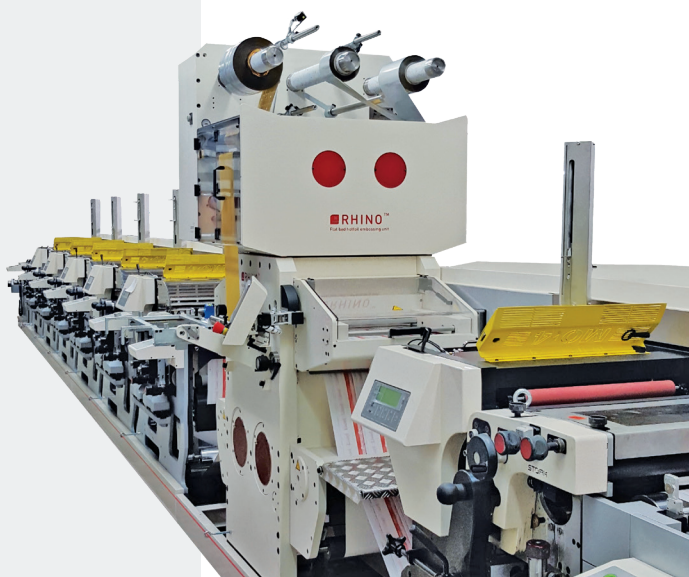
- Option Schnittstelle:** A list box containing 'Schnittstelle Galus RCS', 'Schnittstelle Flowman 410 (PGS)', and 'Schnittstelle Standard'.
- Option Laser:** A checkbox that is currently unchecked.
- Pos. Taktantrieb 1:** Radio buttons for 'MS' (selected) and 'OS'.
- Hologram 1 RCS:** Radio buttons for 'ja' (selected) and 'nein'.
- Pos. Taktantrieb 2:** Radio buttons for 'MS' and 'OS' (selected).
- Hologram 2 RCS:** Radio buttons for 'ja' (selected) and 'nein'.
- Pos. Taktantrieb 3:** Radio buttons for 'MS' (selected) and 'OS'.
- Hologram 3 RCS:** Radio buttons for 'ja' (selected) and 'nein'.
- Pos. Taktantrieb 4:** Radio buttons for 'MS' and 'OS' (selected).
- Hologram 4 RCS:** Radio buttons for 'ja' (selected) and 'nein'.
- Folienabwicklung:** A list box with 'Folienabwicklung 1', 'Folienabwicklung 1+2', and 'Folienabwicklung 1+2+3'.
- Folienbahnen:** A list box with 'Folienbahn 1', 'Folienbahn 1+2', 'Folienbahn 1+2+3', 'Folienbahn 1+2+3+4', and 'Folienbahn 1+2+3+4+5'.
- Taktantriebe RCS:** A list box with 'Taktantrieb 1', 'Taktantrieb 1+2', 'Taktantrieb 1+2+3', 'Taktantrieb 1+2+3+4', and 'Taktantrieb 1+2+3+4+5'.

Buttons for 'Reset', 'Cancel', and 'OK' are located at the bottom right of the interface.

Figure 1 – The options and variants within the Configurator are controlled by a 'decision tree' but, for ease of use, the above user interface can only ever present viable permutations.

Managing options and variants

The variants and options that can be presented at any one time (i.e. as part of the specification process) for a machine are controlled by a 'decision tree' within the Configurator, where every variant and option corresponds to a unique selectable layer within E³.series. The Configurator is designed in UML (Unified Modelling Language), implemented in Microsoft Excel and has a graphical user interface to help sales activities (see figure 1).



The output of the Configurator tool is a set of unique order numbers for the machine being specified, which ties in with Electrical Planning (i.e. electrical schematics and BOMs within E³.series) and Pantec Automation's ERP /PPS system (for parts lists and sales orders etc.). See figure 2.

Process change

The early stages of the machine lifecycle can be thought of as follows. The machine builder first plans for a new machine generation, partnering with Pantec Automation for the control electronics and HMIs. Initial (system) consultation soon moves into system development

and the delivery of a prototype release (or reference machine, in other words) that is highly modular.

For the sales process, when the machine builder specifies an individual machine with a customer all the benefits of modularity come to the fore; due to the modular nature of the machine and the fact that only valid options can be presented. This makes for a very efficient selection process. There will typically be some bespoke work required but from Pantec Automation's perspective, 95% of the work needed to meet the customer's unique overall requirements can go straight to the company's experienced assembly personnel (see figure 3) with little or no design engineering intervention; because it is all policed by the Configurator.

Efficiency goals achieved

Zuken's role is significant. E³.series provides the functionality to customise the electrical wiring for a specific machine out of a selection of valid options for the 'reference machine' that was developed. Hanefeld says: "E³.series delivers the exact 1:1 wiring for the machine as ordered by the customer. And as E³.series is fully integrated with our ERP system, when the wiring information is generated it's the trigger for a host of other assembly-related information."

"Our machine builders can now provide their customers with quotations within a matter of days."

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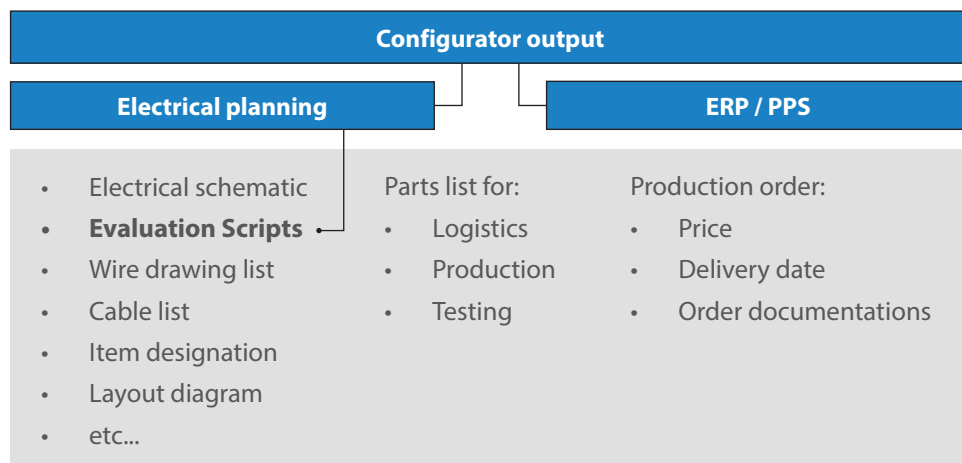


Figure 2– Above, the Configurator tool's link with Electrical Planning (i.e. Zuken's E³.series) and the ERP/PPS. The 'Evaluation Scripts' are automatically generated and can be used to produce output data from E³.series (i.e. the wire drawing list etc.).

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Have quantifiable benefits resulted? Absolutely. “Our machine builders can now provide their customers with quotations within a matter of days. And the order placement to machine delivery time has been cut from up to 17 weeks to as fast as 10 weeks,” says Hanefeld.

“Industry is crying out for modularity,” continues Hanefeld. “We’ve empowered our customers to offer modular solutions which can be customised much faster and can be manufactured for a lower cost than before. We still build and deliver control cabinets, HMIs and cables but, for the first time, E³.series is enabling us and our customers to treat them as modular elements and options. Also, a few of our customers now carry some of our units as stock items that just require configuration in software before going into service. That’s a game-changer.”

The benefits of this new way of working have resulted in improvements to virtually every aspect of the supply chain and the development lifecycle of a machine. Previously project turnaround (from machine order to onsite commissioning)

took about 15 weeks, made us as follows: 1 week for electrical planning, 8 weeks for sourcing, 5 weeks for assembly and 1 week for testing.

Now, project turnaround is about 8 weeks, made up as follows: 0 weeks for electrical planning (it is unnecessary), 4 weeks for sourcing (improved stock management due to the availability of pre-assembled modules), 3 weeks for assembly (clearer assembly documentation, so fewer calls to engineering are needed) and 1 week for testing. This reduction from 15 to 8 weeks for all activities between machine order and commissioning equates to almost 50%.

Hanefeld concludes: “Zuken’s E³.series is good as a CAD package anyway, but it shows its real power when integrated into an ERP. By making better use of the tool’s existing capabilities – and without having to purchase any extras for this project – we have realised immense operational efficiencies in-house. We have also helped our customers be more efficient and more competitive.”



Figure 3 – Pantec Automation’s assembly experts are supplied with the information they need – and only that information – for the machines they are building.