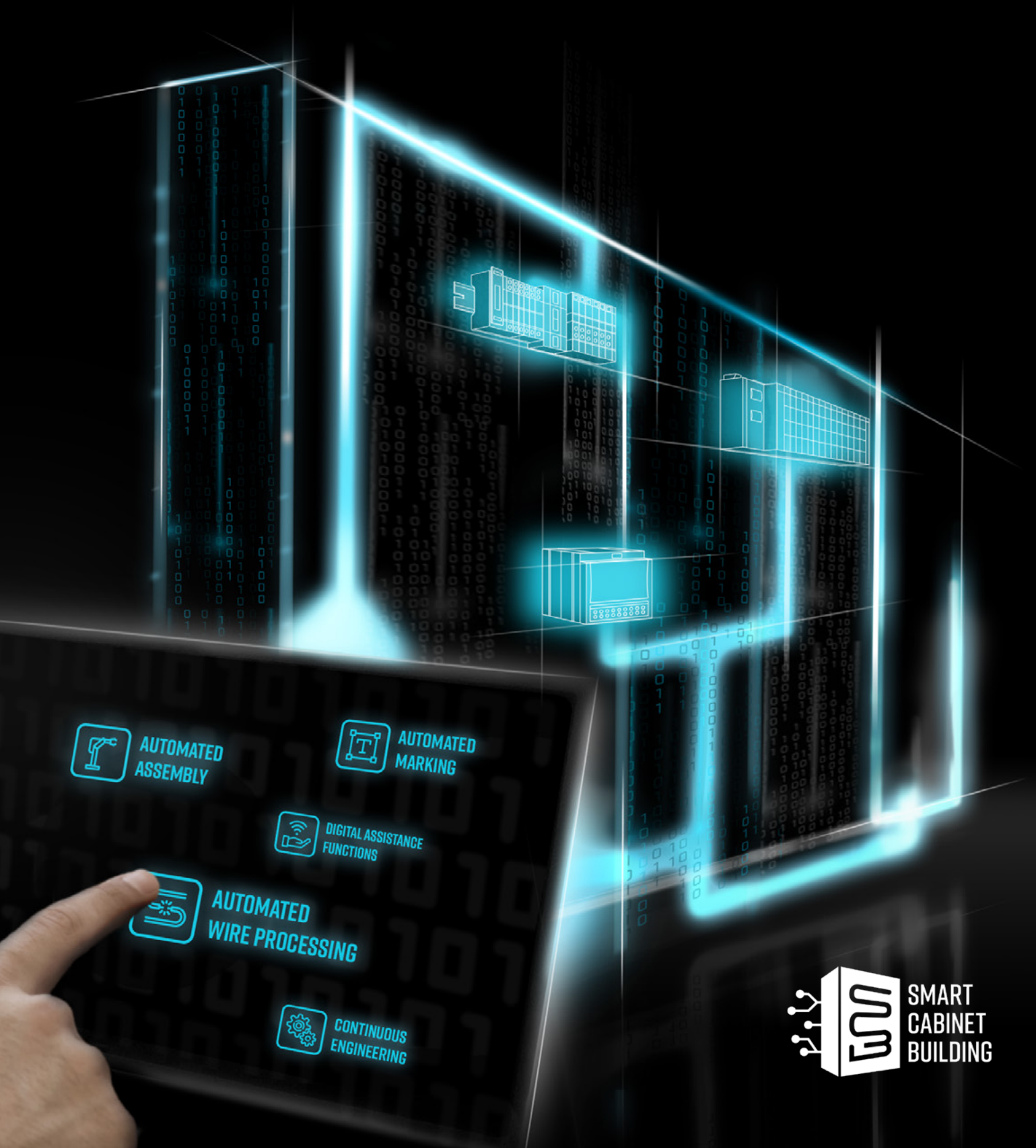


SMART CABINET BUILDING

Networking of technology and expertise





Weidmüller
ZUKEN

komax
ARMBRUSTER
ENGINEERING

nVent
HOFFMAN

SMART CABINET BUILDING

Networking of technology and expertise

Panel building is situated in a remarkable field of tension: An almost unmanageable number of technical features in the face of fast-changing customer requirements, high cost and price pressure with tight deadlines. This can only succeed if the possibilities opened up by automation and digitalisation are adopted to create a perfect interaction between product, process and production equipment. Currently, there is a lack of consistent economical solutions that meet the individual needs of the cabinet builder.

Digitalisation as a lever

Productivity can only be successfully increased by taking a comprehensive view to the individual aspects of the value chain. Huge efficiency increases can be achieved taking advantage of the optimisation potential that exists in the interfaces between the individual process steps. The companies Weidmüller, Komax, Zuken, Armbruster Engineering and nVent Hoffman have launched the SMART CABINET BUILDING initiative in order to enable control cabinet building to tap this potential with tailored, consistent solutions.

The aim of SMART CABINET BUILDING is to provide integrated solutions for current and future challenges in the area of cabinet building by networking technology and expertise across all process steps. This ranges from component selection to the pre-assembly of wire harnesses, equipment and enclosures, right through to assisted final assembly and testing prior to commissioning.



AUTOMATIC
ASSEMBLY



AUTOMATIC
MARKING



AUTOMATIC
CABLE ASSEMBLY



DIGITAL
ASSISTANCE FUNCTION



CONSISTENT
ENGINEERING

INTRODUCTION OF THE PARTNERS

Full steam ahead into the future of control cabinet building

Partner in Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of

tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.



„The aim is to provide integrated solutions for current and future challenges in the area of cabinet building by networking technology and expertise across all process steps.“

Volker Bibelhausen, CTO Weidmüller

Leading the field now and in the future

As a pioneer and market leader in the field of automated wire processing, Komax provides its customers with innovative and sustainable solutions for any situation that calls for precise contact connections. Komax manufactures series and customer-specific machinery

for various industries, catering for every degree of automation and customisation. Its range of quality tools, test systems, and intelligent networking solutions complete the portfolio, and ensure safe and efficient production.



„Cabinet building in particular, with its still high ratio of manual activities, offers very promising approaches. This ranges from component selection to the pre-assembly of wire harnesses, equipment and enclosures, right through to assisted final assembly and testing prior to commissioning.“

Matijas Meyer, CEO Komax Group

Engineering solutions for control cabinet building

With its E3.series suite of E-CAD software applications, Zuken has been a trendsetter for production-related engineering in the fields of electrical engineering, automation and control cabinet engineering.

Zuken's software solutions enable a seamless flow of information from circuit and cable diagram to digitally controlled control cabinet manufacturing according to the concept of a digital twin.



„Through the cooperation in the ‚Smart Cabinet Building‘ initiative, we want to make our contribution to developing substantial optimisation potential in building electrical cabinets including their interconnects based on the digital twin.“

Joachim Frank, Managing Director Zuken E3 GmbH

The assistance system for manual production

Armbruster Engineering is an owner-managed company which has offered assistance systems for production in various industries and company sizes for more than 20 years. The core is to build up a secure parts supply and a controlled assembly. With our

ELAM system, we strengthen the shop-floor level through assistance systems and process monitoring.



„The combination of fully automated solutions and digital assistance systems that guide the employee during manual installation, as well as controlling and monitoring the tools being used, are the key factors for success in practice.“

Henning Vogler, Managing Director of Armbruster Engineering



Sustainable increase in productivity in modern switchgear construction

nVent Hoffman / Steinhauer GmbH has been part of the nVent family since 2015. With contemporary and innovative solutions, we meet the challenges of modern switchgear construction of today and tomorrow. Our focus is on modern automation systems that gu-

arantee our partners maximum productivity, precision and flexibility. At nVent, we believe that safer systems make for a safer world. We connect and protect our customers with innovative electrical solutions.

„nVent Hoffman has been automating control cabinet for decades. We are very pleased to be able to use our experience in making control cabinet manufacturers competitive and more efficient with the other partners and solutions of Smart Cabinet Building.“

Hermann Nagel, Managing Director of Steinhauer GmbH



COMPREHENSIVE VALUE CREATION

For more productivity from planning to operation

The aim of SMART CABINET BUILDING is to provide integrated solutions for current and future challenges in the area of cabinet building by networking technology and expertise across all process steps — from component selection to the pre-assembly of wire harnesses, equipment and enclosures, right through to assisted final assembly and testing prior to commissioning. The base for networking the process steps is the “digital twin”, a complete digital description of the control panel and its components that can be used to drive the various process steps.

Digital Engineering

The Digital Twin as central enabler

In times of digitalisation, data is of crucial importance, especially in the case of control cabinet building. User-friendly tools support the construction of an entire control cabinet, as well as the configuration of the individual terminal strip.

Logistics and Mechanics

Modification made easy

In production, everything starts with picking the right components and then modifying the enclosure and other mechanical components - automation has been the established practice here for decades.

Component Assembly

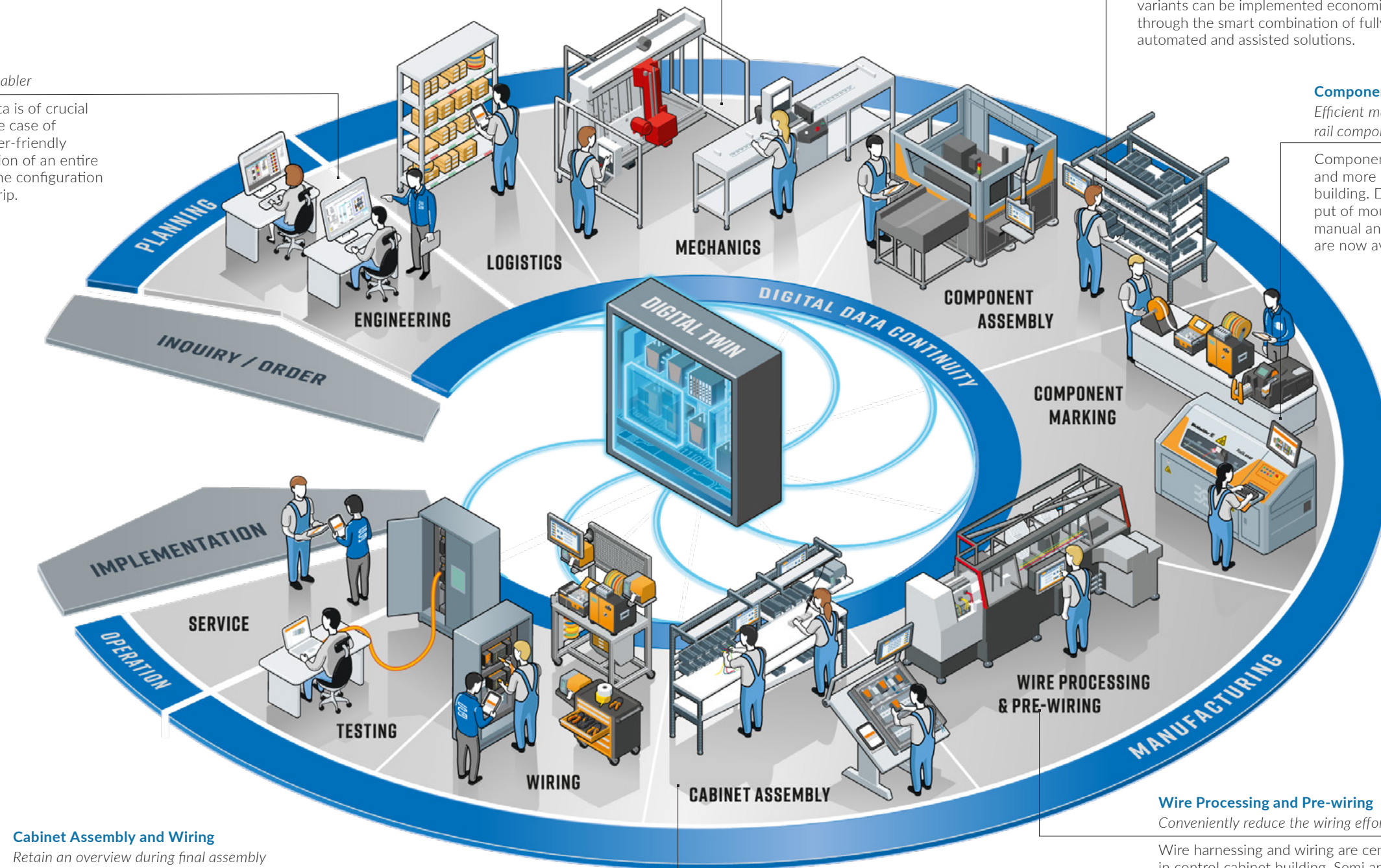
The right components in the right position at the right time

Control cabinet building is characterised by the enormous variety of components used. The commissioning and subsequent assembly is therefore of particular importance. Here, the wide variety of variants can be implemented economically through the smart combination of fully automated and assisted solutions.

Component Marking

Efficient marking of mounting rail components

Component marking is becoming more and more important in control cabinet building. Depending on the throughput of mounting rail components, both manual and fully automatic solutions are now available.



Cabinet Assembly and Wiring

Retain an overview during final assembly

During the final control Cabinet Assembly and Wiring, it is important to always keep an overview. Digital assistants for the assembly process and wiring simplify the work for the employee.

Wire Processing and Pre-wiring

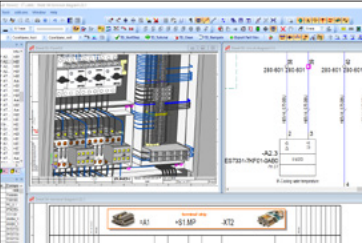
Conveniently reduce the wiring effort

Wire harnessing and wiring are central cost drivers in control cabinet building. Semi and fully automatic solutions for wire harnessing provide an answer here. The available data is conveniently enriched to the required level by software solutions.

OUR SOLUTION RANGE

For every phase of control cabinet construction

Engineering



Simple control cabinet design with Zuken E3.series

E3.series is a software solution for true concurrent engineering for electrical engineering that meets demanding requirements for electrical documentation, cabinet and harness design and machine assembly.

Your advantages:

- Consistency from circuit diagram to finished control cabinet
- Comprehensive results for production and documentation



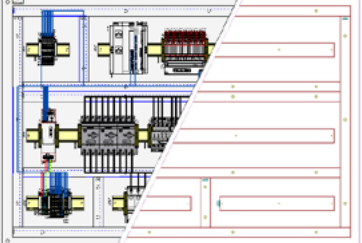
Terminal strip configuration with the Weidmüller Configurator (WMC)

The WMC is a software solution for selection, configuration and inquiry of more than 8,000 digital Weidmüller products (mounting rails and mounting rail components). The tool supports consistent engineering workflows from planning with E-CAD systems to documentation.

Your advantages:

- Proven configuration design in 3D
- Seamless E-CAD integration
- Comprehensive interfaces

Mechanics

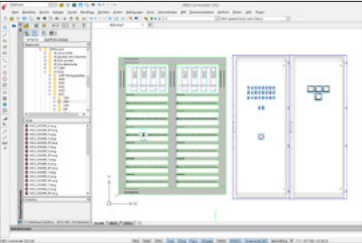


Mechanical housing and mounting plate machining

E3.CutOut generates data with one click that can be read in on all common machining centres for mechanical housing and mounting plate production. In addition, a drawing can be generated on the E3 sheet for documentation purposes.

Your advantages:

- Technology-neutral export format for all common machines on the market
- Flexible colour and layer definition
- Easy handling



Optimises one-off and series production with CE 4.0 software

The DXF- and DWG-based CAD software allows existing drawings to be imported or assembly drawings to be created by drag & drop. Thanks to the integrated CAD software and large symbol library, even complex drawings can be created quickly - in engineering or directly on the machine.

Your advantages:

- Extensive use of the ModCenter even with the smallest batch sizes
- High cost savings with best quality - generates also data for the Nc Cut
- Consistent documentation

Mechanics



Modification of control cabinets with the ModCenter

The nVent HOFFMAN ModCenter is the most versatile automated modification solution on the market. Reduce lead times by stocking cabinets or quickly available cabinets according to your schedule.

Your advantages:

- Easy handling
- First class cutting speeds
- Repeatable precision
- Cost-reduction for the modification of more than 75% in line with significant better performance



Cable Duct & Din Rail Prep Made Easy with the Nc Cut

Take Control. Get the Edge. By importing your already created mounting panel layout drawings into the machine software, the Nc Cut provides a simplified cut list and guides you through the cuts with ease.

Your advantages:

- Cutting wiring ducts and profile rails to size
- Feeding of the material up to the motorised stop
- Simple allocation of the parts on the mounting plate through labelling

Component Assembly



Assembly with the RailAssembler

The Klippon® Automated RailAssembler in combination with the Weidmüller Configurator (WMC) software allows automatic assembly of terminal strips. Using the automated system eliminates picking, assigning and positioning of individual terminals.

Your advantages:

- Efficiency increase by up to 60 %
- Quality through data consistency
- Simple handling



Assisted terminal block assembly with ELAM

Terminals and components not automatically installed onto the mounting rail can be added manually with the ELAM system. ELAM guides the employee through the assembly process. The position, where the terminal has to be mounted, is projected onto the mounting rail.

Your advantages:

- Automatically generated work instruction
- Display of terminal positions directly on the mounting rail
- Assembly process completely secured and documented

Component marking



Fully automatic marking with the RailLaser
In conjunction with the Weidmüller Configurator (WMC), the Klippon® Automated RailLaser enables fully automatic marking of pre-assembled terminal strips. Thanks to the markers already applied, the time-consuming process of cutting out, assignment and snapon is eliminated.

- Your advantages:**
- Efficiency increase by up to 90 %
 - Quality through data consistency
 - Outstanding marking quality

Wire processing and pre-wiring



Automatic wire processing with the Komax ZETA
With the pre-production of ready-to-install sets, enormous gains in efficiency are achieved in the wiring of control cabinets. For this purpose, Komax offers machines for every level of automation, for example the ZETA for fully automatic processing of 36 different stranded wires.

- Your advantages:**
- High efficiency and quality
 - Reliable machine concepts
 - Prefabricated wire bundles for efficient assembly
 - Advice, service and spare parts near you



Data preparation with Komax Digital Lean Wiring (DLW)
The DLW software offers a simple way to determine missing wire production data if 3D structures and connection lists are missing. Thereby, the length can be determined virtually, and the optimized wiring sequence can be specified using the bundle function.

- Your advantages:**
- Closes the gap between design and production
 - Determination of the connection length even without 3D construction
 - Optimal bundling of the connections saves time



Fully automatic labeling of wires or tubes
Thanks to the fully automatic labeling using an inkjet or tube marking module, each wire is provided with correct and complete labeling. Errors during assembly are minimized in this way. Customized, automatic and without additional time expenditure.

- Your advantages:**
- Sources of error are noticeably reduced
 - Efficient and permanent labeling of wires
 - Optimal readability for every application

Wire processing and pre-wiring

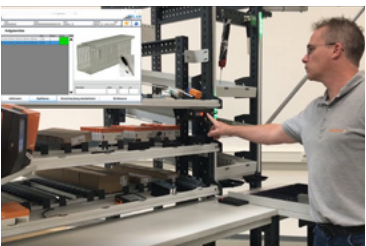
- Your advantages:**
- Time savings of up to 80 %
 - High flexibility due to modularity
 - Excellent quality



Semiautomatic cable assembly with the Wire Processing Center (WPC)
The software-controlled, partially automated cable assembly with the WPC speeds up the production process considerably and at the same time satisfies the highest demands on quality. Minimising errors and increasing efficiency go hand in hand here.

Cabinet Assembly

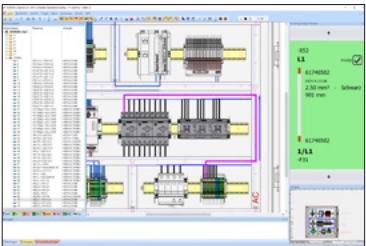
- Your advantages:**
- Projection of the components onto the mounting plate
 - No preparation effort
 - Optimal assembly sequence



Assisted mounting plate assembly with ELAM
For the assembly of mounting plates, all components are assembled in a systematic assembly sequence. The ELAM Assistant is used to mark the correct mounting position directly onto the mounting plate. Electrical tools can be controlled and monitored.

Wiring

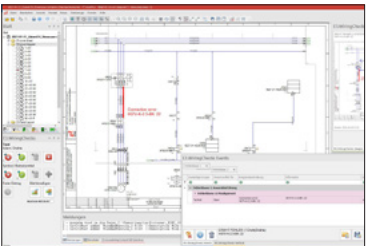
- Your advantages:**
- Virtual wiring displays all parameters like source, destination, wire end treatment and sleeve information
 - Vertical and horizontal layout support



Wiring assistance with the Zuken E3.WiringCockpit
The E3.WiringCockpit enables digital support for control cabinet wiring on a portable terminal device. The routing path in the control cabinet is highlighted and all additional relevant information for the user is displayed.

Testing

- Your advantages:**
- Recording of wiring faults and description directly in the diagram
 - Targeted processing of the elimination of faults and renewed control acceptance
 - Complete documentation



Verification of fully wired cabinets
E3.WiringChecks supports the testing of a fully wired machine, vehicle or control cabinet before or during the commissioning phase. Results can be documented as part of the E3 data record.

Networking technology and expertise

SMART CABINET BUILDING is an initiative of the companies Weidmüller, Komax, Zuken, Armbruster Engineering and nVent Hoffman. The offering combines the expertise of the five project partners to support customers from a wide range of industries in optimising their processes. It includes the provision of fully automated solutions and comprehensive services for electrical cabinet construction.



Weidmüller 
ZUKEN

komax
 **ARMBRUSTER**
ENGINEERING

 **nvent**
HOFFMAN

More information:

www.smart-cabinet-building.com