EPLAN
efficient engineering.

EPLAN Engineering Configuration

CONFIGURATION AUTOMATION

FRIEDHELM **LOH** GROUP

EPLAN

EPLAN – efficient engineering.

Configuration and automation are key

**Modern modular system for mechatronic configuration**

Today's machine and plant manufacturers face many challenges. Increasing global competition and more specific customer demands increases the pressure on costs and time. Anyone wanting to be successful in a global market needs to optimise the utilisation of productive potential in their company. Specifically in the engineering process, a lot of optimisation can be achieved.

The introduction of a modern CAE system can be key, although this is not generally sufficient as a stand-alone measure. The key to success lies in consistent standardisation and automation of engineering processes – in not one, but in all areas. This is the only way to make processes more efficient and connected to achieve higher profitability.

Made to measure instead of "made to fit"

The more complex the requirements, the more professional the solution needs to be: therefore, EPLAN has developed a strategy for implementing standardisation, modularisation and structure. For this implementation, innovative software solutions are available:

- EPLAN Platform
- EPLAN Engineering Configuration One (EEC One)
- EPLAN Engineering Configuration Professional (EEC Professional)

PROCESS CONSULTING   **ENGINEERING SOFTWARE**
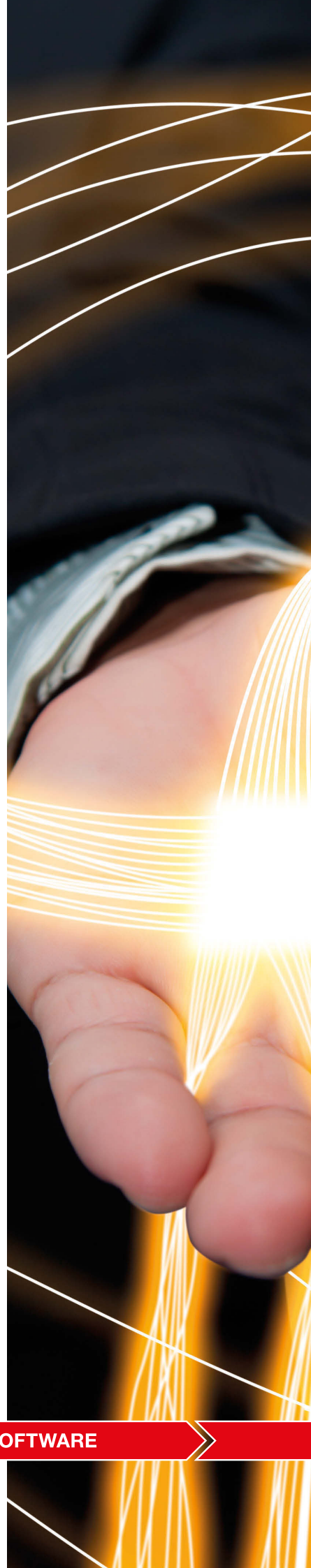
Perfectly tailored service concept for you

EEC One as an automation solution and EEC Professional as configuration centre can each be tailored to your exact requirements. Not only do we professionally and continuously guide our customers through the entire automation process: from consulting to standardisation via the usage of the macros and variants technology all the way to mechatronic configuration, but we also always have your corporate goal in sight. Therefore, EPLAN can offer you a truly custom-fit technology and service concept.

BASIC ENGINEERING

DESIGN AUTOMATION

CONFIGURATION

Capturing and Structuring

of engineering data

Automatic Generation

of engineering documentation

Mechatronic Configuration

of Components, Machines & Systems

STANDARDISATION – MODULARISATION – STRUCTURE

APPLICATION

IMPLEMENTATION

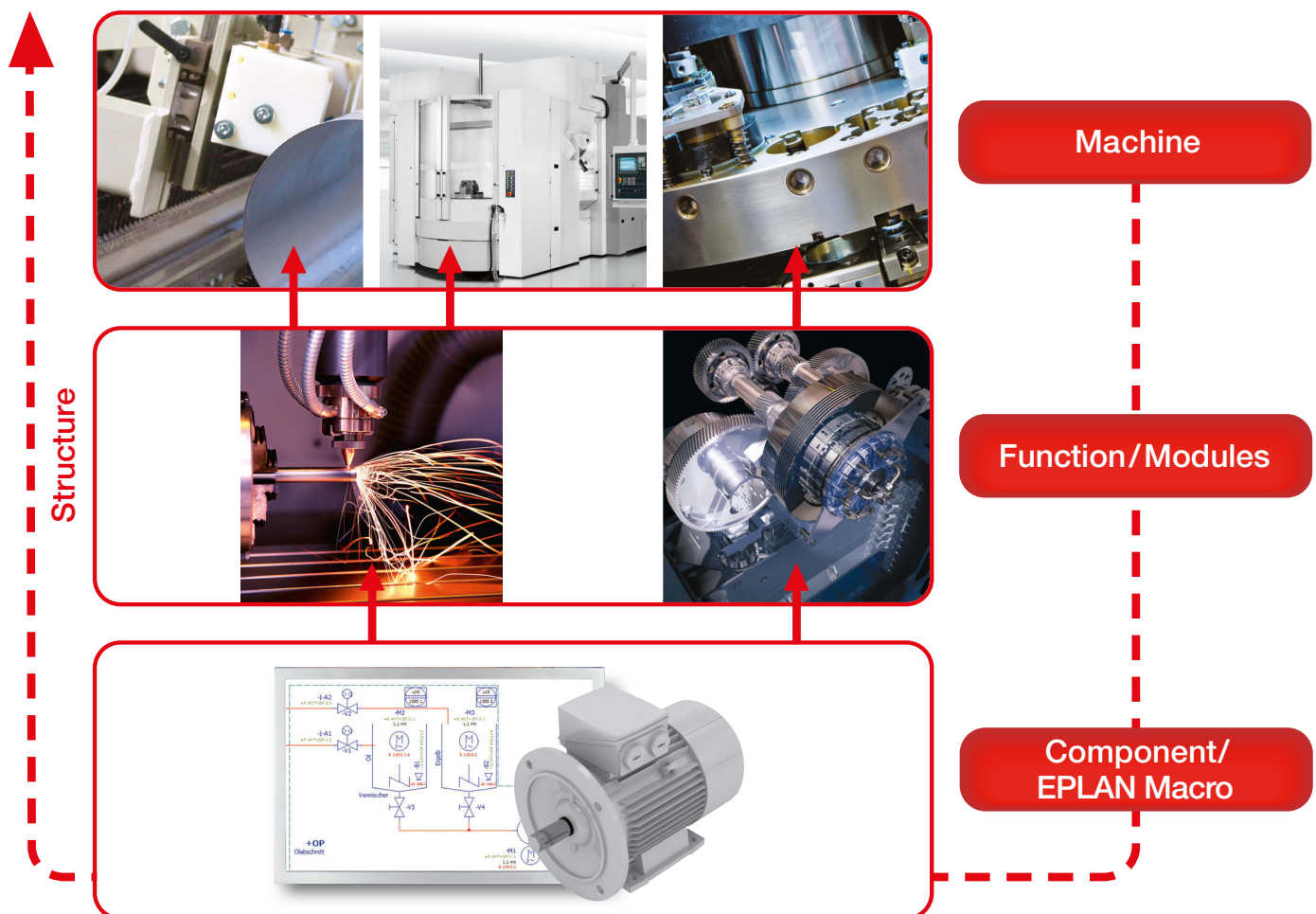**GLOBAL SUPPORT**

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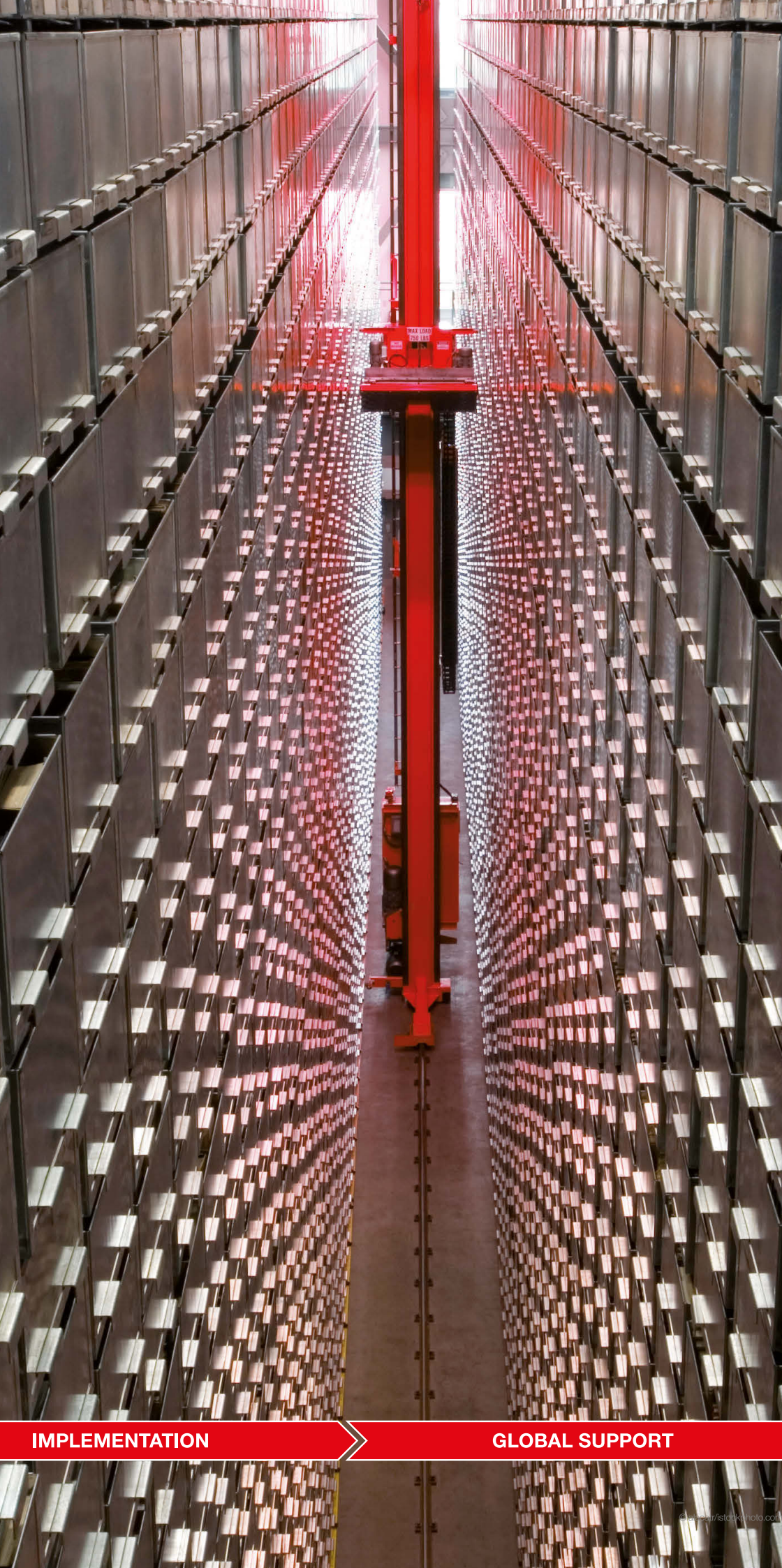
Standardisation creates transparency

Meeting targets by defining clear standards

Through the definition of standards a binding database is created, on which automation and configuration processes in companies can be systematically pursued. Standardisation is an important step to increase productivity and can immediately reduce effort and costs.

During the analysis and creation of required standards within your company you will be constantly supported by experienced EPLAN consultants. The joint analysis provides the basis for selecting the appropriate EEC solution for you and gives you answers to the following questions:

- Do you manufacture machines and plants with high or low variance in the documentation?
- Is the standardisation based on one discipline or is there potential for interdisciplinary standardisation?

Structure

Machine

Function/Modules

Component/ EPLAN Macro

PROCESS CONSULTING   **ENGINEERING SOFTWARE**

Standardisation in engineering – your benefits:

▪ **Better quality**

Consistent document structures ensure a reduction in incorrect entries and discrepancies in production documents.

Minisize efforts

The one time definition of master data and binding guidelines ensures that engineering know-how is centrally stored and can be reused.

▪ **Huge time savings**

The automated documentation of reusable functions reduces engineering time significantly. This allows free resources to be used for the development of new technologies.

ePLAN

Discipline-specific standardisation

EPLAN®
engineering configuration One

▶ "A department in check" – what is being looked at?

For discipline-specific standardisation, the focus is on processes or reusable product components within a specific company department. The consistent definition and centralised storage of reusable elements, templates and design rules produces a comprehensive database. The next stage is to use this to automatically create production documentation.

▶ What is the procedure?

The following questions are key to discipline-specific standardisation:

- What documentation structure is required?
- Which are the reusable elements?
- What construction guidelines should be followed?
- What does the data structure look like?
- What reports are required?

The first stage of discipline-specific standardisation in the ECAD department could involve the definition of project templates along with their document structures and reports (e. g. cable and terminal diagrams, wire lists). Then, reusable partial circuits (e. g. schematic macros) could be put in the spotlight. This means that a motor control macro can have several variants. Value sets are also defined, such as the motor size, as this then influences the technical specifications for the motor cable.

▶ What software is used?

Project templates are produced based on the EPLAN Platform, partial circuits (macros) are saved and made available in a central macro project library. Discipline-specific standardisation is finalised by the definition of the project-specific parameters within a simple Excel® front end for the EEC One.

IN SHORT: Discipline-specific standardisation secures project knowledge, saves costs and time, and improves quality!

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PROCESS CONSULTING   **ENGINEERING SOFTWARE**

Interdisciplinary, mechatronic configuration

▶ "All engineering processes on the test bed" – what is being looked at?

What works on a small scale can work on a large scale too: the benefits derived from standardisation in ECAD can be multiplied if standardisation is applied across the company, rich in variants and on a mechatronic basis. Interdisciplinary standardisation highlights all departments, from mechanical to fluid and electrical engineering to sales.

▶ What is the process?

Interdisciplinary structures will be defined in conjuction with experienced EPLAN consultants. This means breaking down reusable functional units of a machine or plant into mechatronic components.

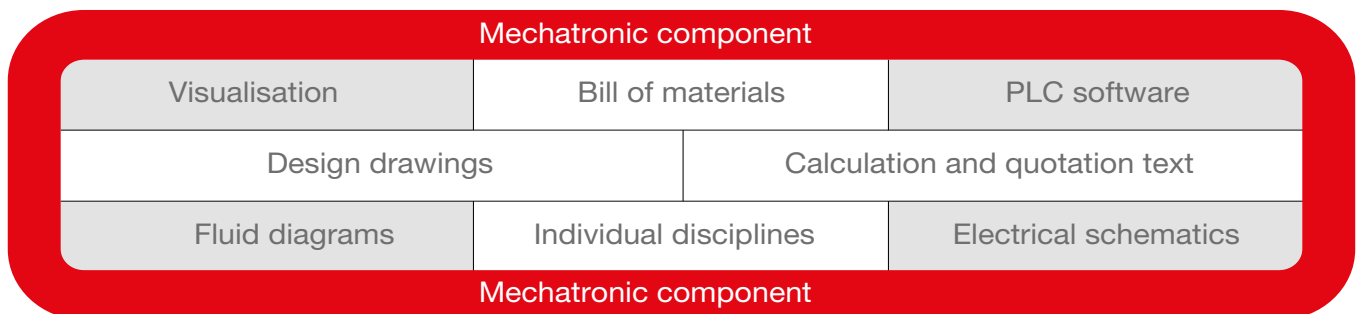The following questions need to be answered:

- How can mechatronic components (e. g. grabber units) be enriched by discipline-specific standards?

- What departments are involved?
  Sales (calculations/quotation), mechanical, hardware (schematics/bills of materials), software (PLC programmes, assignment lists, visualisation images), machine documen-tation, etc.

Dependencies between the disciplines in a component or among components themselves are described by rule sets. These provide an independent definition of the potential uses of the components.

Once the mechatronic components have been described, they are saved centrally in an interdisciplinary module. This allows the standardisation team to reduce even complex machine and plant units down to just a few components. The modules provide a better overview of the range of different variants, whilst securing data in a central location. Another benefit is that your company know-how is secured centrally.

▶ What software is used?

The range of variants is made manageable by the high-performance EPLAN Engineering Configuration Professional software. The open architecture and numerous interfaces to different expert systems means the possibilities are end-less. The definition of the rule set and the central storage of building blocks provides optimum support for variant management across all departments.

Mechatronic component		
Visualisation	Bill of materials	PLC software
Design drawings	Calculation and quotation text	
Fluid diagrams	Individual disciplines	Electrical schematics
Mechatronic component		

IN SHORT: The interdisciplinary approach gives you a firm handle on complex variant management.

IMPLEMENTATION → GLOBAL SUPPORT →

Innovative methods in engineering

Uncomplicated operation

EEC One finds its application in discipline-specific standardisation. It is an essential element of an advanced automation strategy.

With the discipline-specific partial circuits, reusable hardware information can be generated. Using an Excel® front end, you have the option to intelligently combine input information such as motor lists or part lists from upstream departments with partial circuits (macros). All Excel® functions are available to you. A simple introduction into the world of automation is thus assured.

Clever technology

The excellent connection between the EEC One and the EPLAN Platform optimises the operation options of our software solution.

▪ Macro navigator

The built-in macro navigator provides visual support. With its help, you can easily visualise all macro variants, representation types and macro types. It makes allocation of the input information easier.

▪ Efficient data management

Meta data, e. g. project information, can be exchanged bi-directionally or read directly via external systems. This reduces manual input routines and redundant data maintenance.

▪ Integration of value sets

EEC One supports the automatic activation of value sets and related technical information such as cable cross section, motor protection devices and parts for motor circuits for example. If a predefined value set is selected in EEC One, the system automatically completes the missing values in the macro.

Input information from upstream departments

- ▪ Sensor lists
- ▪ Actuator lists
- ▪ Motor lists
- ▪ Parts lists
- ▪ Value tables

Excel   Database   Text

PROCESS CONSULTING

Optimum results

Once configuration is complete, generation of fluid and circuit diagrams or panel layouts can begin. At the touch of a button these can be generated per sheet or as a complete project in the EPLAN Platform. This enables pages with macros and project information to be produced individually, to the customer's specifications. Manual editing is either partially or completely removed.

The generation of reports such as tube or hose lists for fluid technology, cable lists for electrical engineering and bills of materials for the ordering process can be initiated directly from the EEC One into the EPLAN Platform.

The EPLAN Platform also supports scripting technology, which is an exciting additional benefit within the automation process: for instance, this allows automatic translation of the project via the EEC One/EEC Professional, or enables the user to view the finished project as a PDF document. This guarantees quick, neutral data exchange.

Macro project
- Variants
- Macros
- Value sets
- Templates

- Project information/data

Project 1   Project 2   Project 3

Standardisation

ePLAN electric P8   ePLAN fluid   ePLAN pro panel

Automation

ePLAN engineering configuration One

Projects generated

ePLAN electric P8   ePLAN fluid   ePLAN pro panel

ENGINEERING SOFTWARE
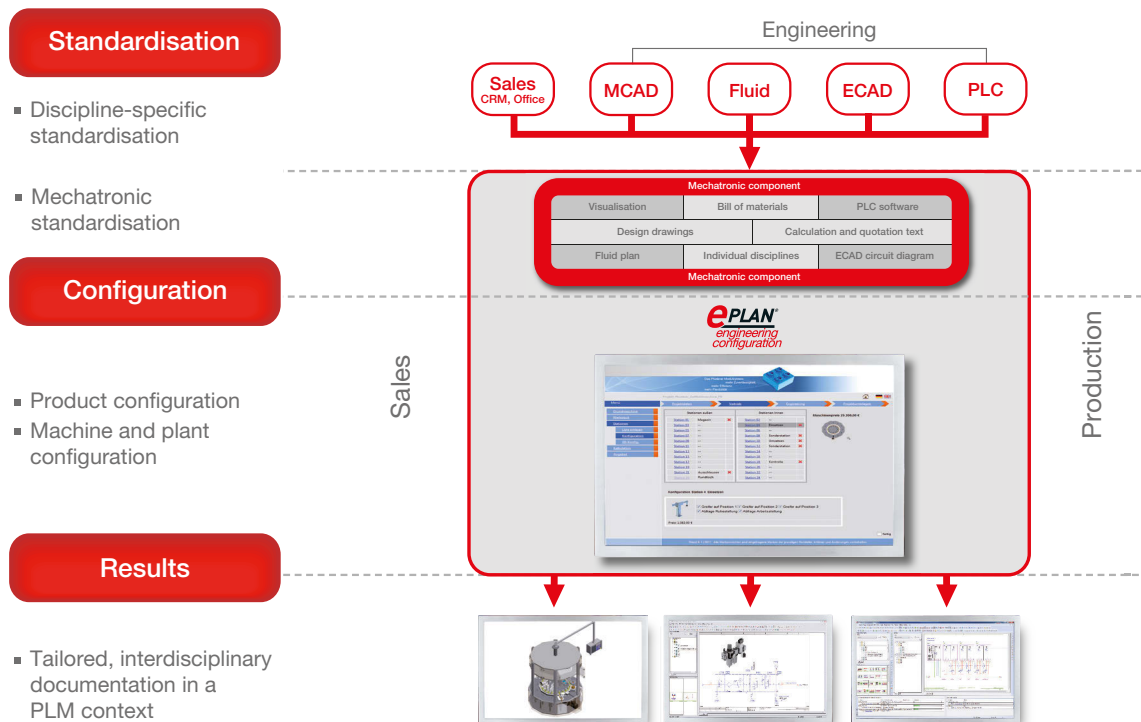
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EEC Professional

Mechatronic configuration for complex tasks

High-performance tool for individual requirements

EEC Professional is designed for complex requirements with high variance. Besides the ECAD and fluid region (EEC One) also mechanical, PLC or documentation data are included and efficiently managed using configuration techniques. This is achieved by the application of knowledge-based libraries of predefined mechatronic components, whereby all technical dependencies and connections are considered.

This rule-based approach to automated configuration of components, machines and plants has several benefits: Tedious, repetitive engineering tasks are eliminated, the quality can be improved considerably and the lead time from sales to production is reduced significantly.

The optimisation of engineering processes has proved in practice to be a demanding task. A methodical and progressive approach is needed to improve the engineering and design efficiency. Our experienced consultants are happy to advise you in the decision making process.

Standardisation

- Discipline-specific standardisation

- Mechatronic standardisation

Configuration

- Product configuration
- Machine and plant configuration

Results

- Tailored, interdisciplinary documentation in a PLM context

Engineering

Sales CRM, Office | MCAD | Fluid | ECAD | PLC

Mechatronic component

Visualisation	Bill of materials	PLC software
Design drawings	Calculation and quotation text
Fluid plan	Individual disciplines	ECAD circuit diagram

Mechatronic component

ePLAN engineering configuration

Sales

Production

IMPLEMENTATION

Product configurator

EEC Professional as the product configurator is the central link between product development, production and customer requirements. Intelligent user interfaces lead both customers and sales representatives to the variant they require based on data entered previously during the mechatronic standardisation process.

The strengths of product configuration at a glance:

- ### High fit accuracy

With configuration screens tailored to your product portfolio, your sales representatives have the optimum basis for providing your customers with tailored solutions. The pre-defined rule set in the module provides peace of mind that only technically adapted configurations of variants and options requested by sales can be combined with one another.

- ### Simplification of quotation processes

The product arising from the configuration process can then be transferred easily into a detailed quotation template or price calculation. The individual quotation items automatically refer back to the price information in your ERP system (e. g. SAP).

- ### Plans at the touch of a button

In order to add value to your quotation or support your production department, EEC Professional also generates 3D drawings or schematics based on the product configuration. At the same time, EEC Professional aims to optimise coordination between sales, design and production.

- ### Support for online sales

As an additional bonus, the software allows the uncomplicated marketing of your products via the internet or intranet. Based on the product configurator, you can use EEC Professional to automate the entire quotation process as far as the purchase order, thus relieving your sales team of routine tasks.

GLOBAL SUPPORT

Configuration solution for complex components, machines and plants

Machines and plant configuration system

While the use of an automated configurator is widespread in the product business, it is just beginning to gain popularity in the specialised machinery and plant engineering sector. Support from a cross-disciplinary configuration solution is immensely important in this sector. While changes are constant during machine or plant design, reusable and different functions can fulfill diverse machine variations. This is precisely the approach of mechatronic configuration.

This innovative approach gives the specialised machinery or plant manufacturers high levels of transparency and top quality in the engineering process. The newly obtained flexibility in everyday business can mean a decisive competitive edge in the project business.

The unique value propositions

- **Highly customisable**

The groundwork for the mechatronic configuration is done through the discipline-specific and mechatronic standardisation. The resulting modules incorporate the defined and tested functions. Depending on the customer requirements, machines or plant are put together individually, based on these modular components.

- **Reduced engineering effort**

The central, interdisciplinary mechatronic configuration (functional description) can be used to generate complete documentation at the touch of a button. This can include quotations, 3D drawings, fluid and electrical circuit and PLC programmes, on an order-specific basis. This drastically reduces the effort required for production and documentation.

- **Better quality**

The defined rule set and automated processes in EEC Professional automate most manual data entries and avoids data duplication. This improves the quality of the production documentation.

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Product comparison

Overview of features

Features	EEC One	EEC Prof.
Area of application	Automation solution for the designer	Integration of configuration in business processes
Configuration options		
Discipline-specific	✔	✔
Interdisciplinary		✔
Product configuration		✔
Rule definition		
Excel®-based	✔	
Object-oriented modelling		✔
Automation options		
EPLAN Electric P8	✔	✔
EPLAN Fluid	✔	✔
EPLAN Pro Panel	✔ (basic)	✔
3D CAD systems		✔
PLC/HMI		✔
Microsoft Office®		✔
Interfaces to		
CRM systems		✔
ERP systems		✔
PDM/PLM systems		✔
Web solutions		✔

✔ includes   ✔ basic functions

IMPLEMENTATION   GLOBAL SUPPORT

EPLAN

Added value in terms of costs, time and quality

EPLAN Engineering Configuration One

Standardisation

- Increased repetition rate through standardisation in engineering.
- Improved quality through defined processes.
- Avoidance of frequent engineering errors through the reuse of existing information.

Automation

- Reduced costs thanks to configuration of partial circuits and projects.
- Generation of EPLAN Electric P8 and EPLAN Fluid and EPLAN Pro Panel reduces engineering time.
- Quality increases thanks to reduction of routine manual tasks in engineering.

System openness and flexibility

- Easy entry to the world of automation with step-by-step conversion to automated engineering.
- Support of EPLAN internal automation technologies to ensure optimum integration.
- Support of various different automation technologies with different optimisation potential.

EPLAN Engineering Configuration Professional

Standardisation of functional components

- Streamlining effect thanks to reuse of defined components.
- Customer requirements are easy to fulfil as individual parameters ensure a large variety of options.
- Fast, accurate calculation options for customer enquiries.
- High quality achieved through the use of tested, error-free components.
- Time saved on commissioning and maintenance thanks to standardised, and therefore known, structures.
- Reproduction of many different variants using a few parameterisable components.

Automation and parallelisation of project processes

- Minimisation of configuration time and costs.
- Rationalisation potential allows free resources to be shifted to the development of new technologies.
- Time savings and quality improvements through a reduction in routine manual tasks.
- Shorter production times.

System openness and flexibility

- Incremental integration of the Engineering Configuration starting with a single discipline.
- Scalable solution ensures a smooth introduction of the system into everyday work.
- Productivity increases can be felt immediately.
- Involvement of further disciplines can be defined individually.

PROCESS CONSULTING   **ENGINEERING SOFTWARE**

Mechatronic configuration

- Consistent flow of information saves duplication and data reconciliation.
- Redundancy-free data guarantees top quality throughout the project.
- Functional components are tailored to the requirements of all disciplines.
- Transparency across engineering by means of clearly structured configuration processes.
- Centralised and structured storage of company know-how.
- Simple use of functional components to encapsulate complexity.

optimisation
PLC programs
special machinery
technologies
EPLAN Platform
construction kit
bill of material
process
mechatronic configuration
automation strategy
CAE systems
variant management
visualisation
data transparency

quality

configuration

integration
construction directives
productivity potentials

top quality
mechanics

standardisation
mechatronics
EPLAN Engineering Configuration
Professional

time saving

mechatronical components

automation
configuration engineering process
fluid power technology
order process
process optimisation

transparency

system openness
PLC software
individual disciplines
electrical engineering

variant management
high precision
technologies
plant engineering
process

integration

EPLAN

EPLAN

efficient engineering.

- Process consulting
- Engineering software
- Implementation
- Global support

EPLAN Software & Service

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