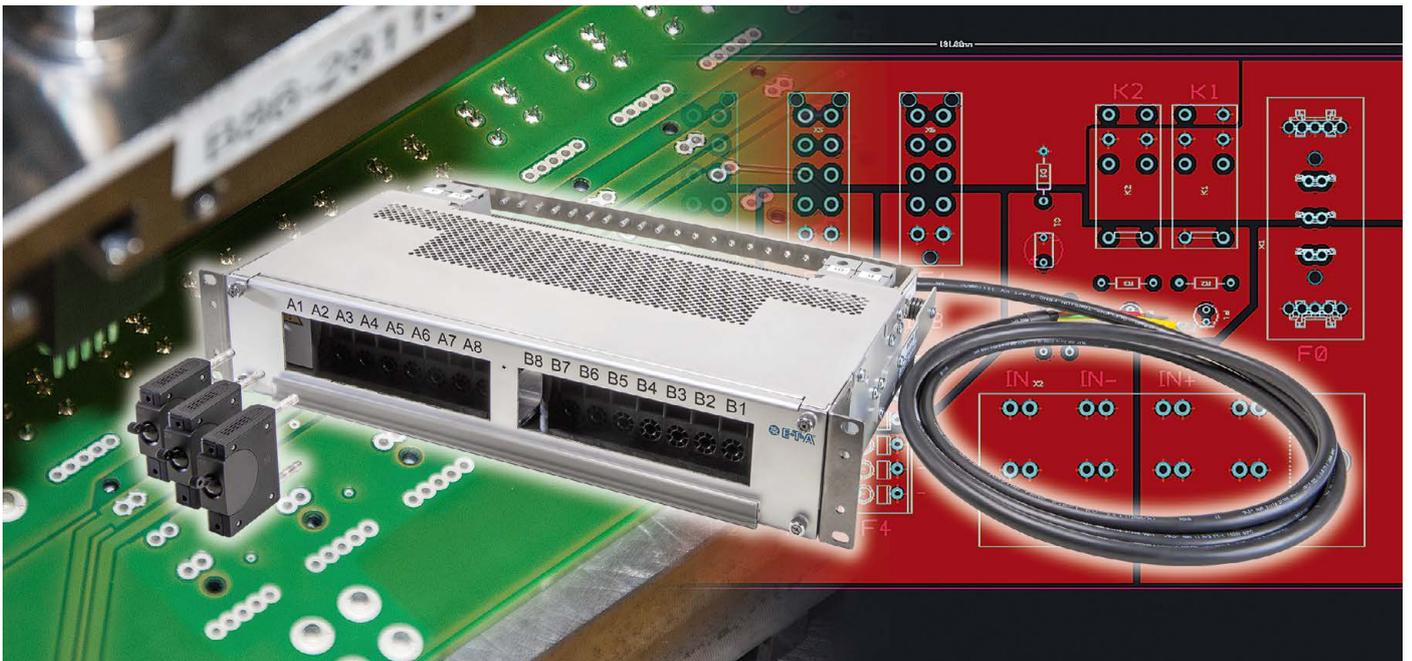


Performance Profile

E-T-A Communication Systems



Performance Profile

E-T-A System Technology

What system engineering »made by E-T-A« means for you: You get your desired product much faster, because E-T-A offers all services from one source: From the initial concept to the complete engineering design, from mechanical to electronic components and even user interfaces. Our target industries include automation technology, telecommunications and telecommunications engineering.

E-T-A is no longer only a manufacturer of components, but a renowned manufacturer of systems in mechatronics. In addition we offer software solutions and service packages. The user is thus able to save time-consuming tests and configuration phases because E-T-A is able

to optimally co-ordinate all components within a system. No further research work or preparatory work has to be done by the customer, because E-T-A solutions comprise the three major disciplines:

- **Mechanical design:**
Housing design, connection technology (connection to the customer's application), internal cable management, components for protection and switching
- **Hardware:**
Layout of printed circuit boards, user Interfaces, control and signal processing of internal and external signalling devices
- **Software:**
Bus communication, protocol technology and power-boosting supportive functions

Software-based E-T-A system solutions provide E-T-A customers quickly, reliably and effectively even with complex information. In connection with the »Internet of Things« this opens up a wealth of possibilities.

Your benefits

- You will receive the requested product much faster
- No time-consuming tests required, all components are perfectly matched
- No preparatory works required, because E-T-A solutions are complete
- Time and cost reduction through a great number of remote operation options



»We are ready to provide E-T-A customers with short project lead times for technically clever solutions – tailor-made to their requirements.«

This means: You will receive samples and prototypes within the shortest of times as well as reliable quality at the promised delivery date.«



Performance Profile

E-T-A System Technology

Why E-T-A as a design partner?

E-T-A has a wide range of production facilities for system technologies. Therefore you will receive complete protection solutions even with small series. At the same time we will also be of assistance if your demand grows or you require medium-sized or large batches.

E-T-A has an in-house punching and bending centre and is therefore able to manufacture system technology components out of raw metals. It does not matter whether they require artless or complex machinery. The terminal finish is done in the E-T-A plating department. This leads to amazingly short project lead times and E-T-A customers are able to install their specially designed components very much earlier.

The range is even wider and also comprises in the electronic assembly process:

- processing of printed circuit boards with **THT technology** (selective soldering or wave soldering)
- the ultramodern and efficient **SMD production**

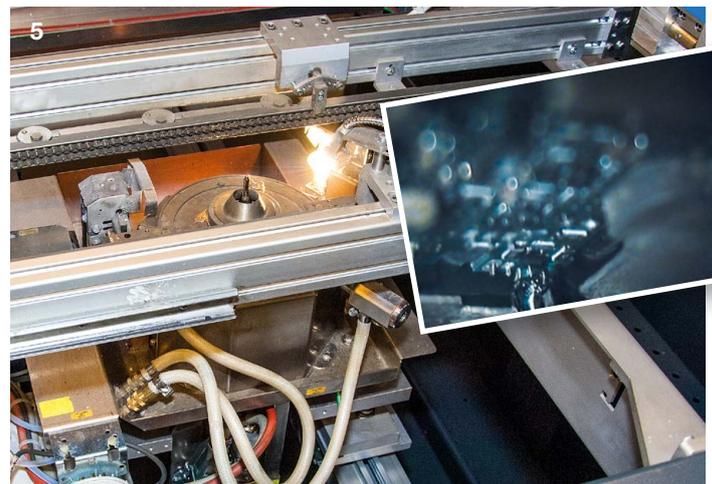
Our independent, accredited test laboratory offers measuring and test equipment for the expert engineering team and for the production units. This also helps E-T-A customers bring their product into the market even faster and create revenue. All system solutions are subjected to severe quality inspection - ensured by the European standard DIN EN ISO/IEC 17025 for test laboratories. Therefore E-T-A can also test systems and switching devices with regard to conformity with the EU directives which do not require an official approval logo. This saves the user time- and cost-consuming approval tests and provides him with invariant quality.

Based on this wide range of production and testing technologies, E-T-A customers will easily find their tailor-made system, supported by the E-T-A Engineering Team.

Your benefits

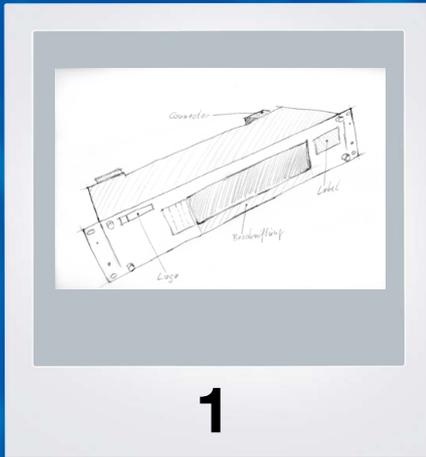
- Complete protection solutions even with small series.
- Amazingly short project lead times due to numerous specialised production capacities within E-T-A
- An accredited test laboratory ensuring reliable and constant quality, saving you expensive approval tests.

- 1 Final assembly of systems
- 2 Evaluation of photomicrograph with cable crimps
- 3 Fully automatic SMD soldering
- 4 Wave soldering
- 5 Selective soldering



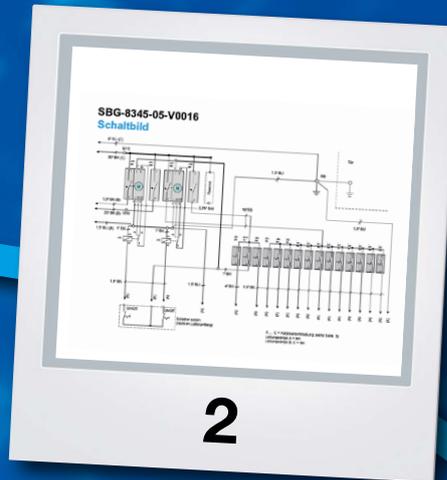
Your E-T-A construction kit

The steps leading to your tailored solution: Including a design sketch, a schematic diagram, the 3-D CAD model and the ready product. During all these design steps, we keep in close contact with you and make sure that the final product fully meets your expectations.



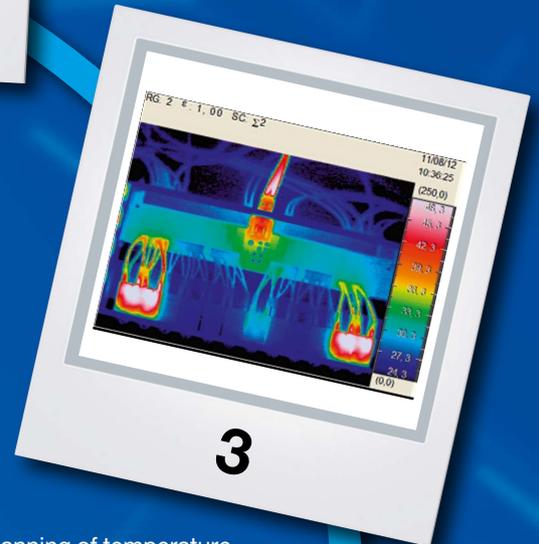
1

Design sketch



2

Schematic diagram



3

Planning of temperature



4

3D CAD design



5

Final product

Mechanical components

Competences in all design areas

E-T-A is doing design work of products according to the latest state of the art, i.e. with modern and powerful design tools and programmes. E-T-A customers can therefore rely on the commercial viability of our solutions.

With regard to the mechanical design, one of the three core competences of »functional engineering«, E-T-A works with

● PTC Creo Parametric

It is used to design housing parts, busbars as well as all punching or bending parts and to carry out collision tests in customer systems. Of course the 3D design programmes have all standardised interfaces. This enables the E-T-A customers to adopt our design solutions quickly and easily into their own systems and to continue working with them.

● Startup Tools

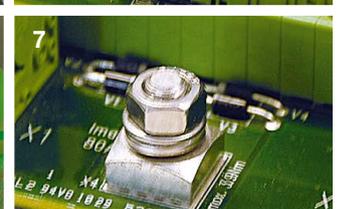
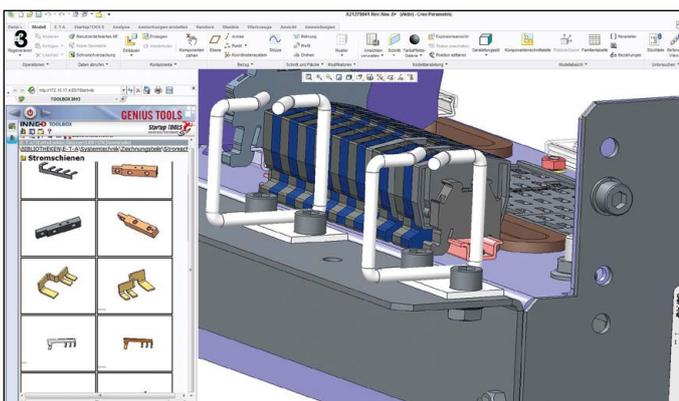
Optimises the use of same parts.

This ensures an economic system approach from the E-T-A customers' point of view. Following the principle of »functional engineering«, sub-assemblies are closed out and verified with the linked function and stored in the databases. It allows quick installation in customer systems without a re-verification. At the same time this system helps recognise which sub-assemblies and functions already have a high parts usage and which are therefore very attractive with regard to pricing.

Your benefits

- Powerful software tools provide maximum profitability of the E-T-A solutions.
- E-T-A customers can adopt the design solutions quickly and easily into their own systems.
- Optimised use of same parts and use of verified sub-assemblies. Additionally increases cost-effectiveness.

- 1 Custom designed wiring assembly work
- 2 Automatic cutting press with multistage follow-on die
- 3 Inneo start-up tools, part of functional engineering
- 4-7 Application-specific connection technologies (e.g. cable lugs, screw terminals, press-fit technology)



Competences in Hardware – CPU – HMI

Hardware CPU, HMI

At this point E-T-A works with **Pulsonix** for creation of schematic diagrams and layouts. Customers have the possibility to import the complete functionality of the E-T-A solutions directly into their CAD system - without any re-modelling. This makes design work much faster, easier and more effective for the customer.

E-T-A offers very effective analyses, combined with simulation tools, e.g. for temperature observations. They provide the customer with clear and reproducible design assistance so as to optimally integrate the E-T-A system into their complete system.

At the same time design engineers use resulting hints for component selection and layout design. The customer is thus able to include the E-T-A system into his own system at a very early stage so that

later adjustments with regard to scope and costs are still possible without any problems. This is an effective help to stay within the planned budget.

E-T-A also offers various processes for connecting components on the printed circuit board. The following is available:

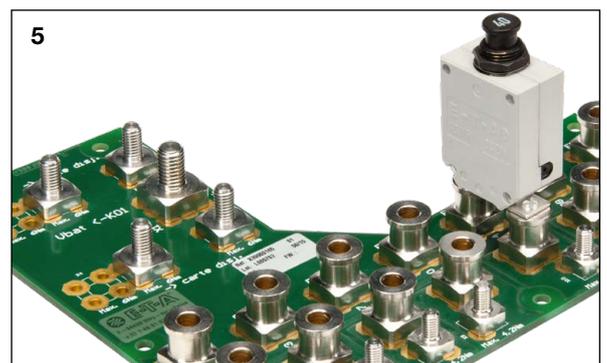
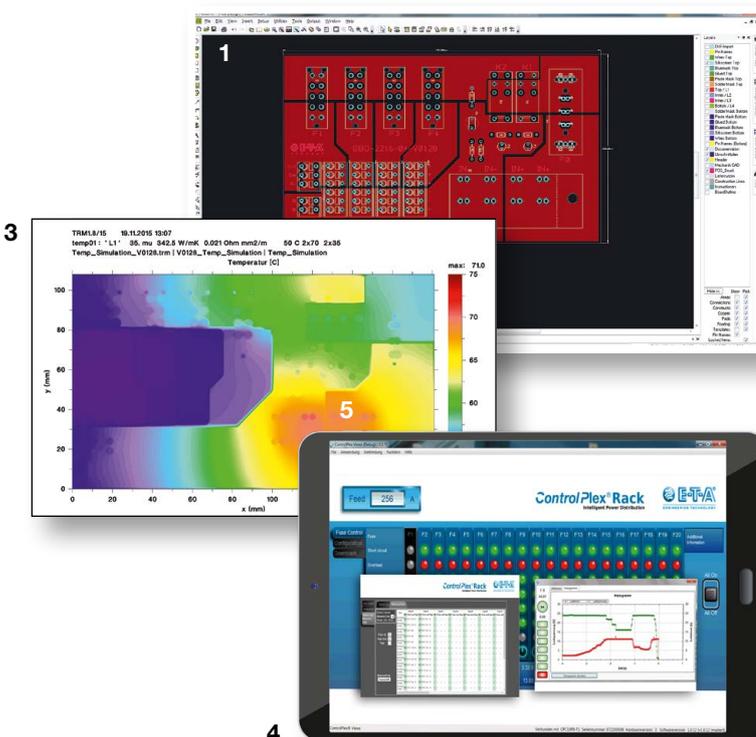
- **Press-fit technology** for supply of high currents (e.g. total currents of 100 to 200 A)
- **THT soldering** (selective or wave soldering)
- **SMD soldering**

All these crucial process technologies can be selected and used based on the customer's application and requirements.

Your benefits

- Design work is made faster and easier because the entire functionality of the E-T-A solutions can directly be imported in their own CAD system.
- Modifications or adjustments are possible without problems.
- Simulation tools provide clear and easily reproducible design assistance so as to integrate the E-T-A system optimally into the customer's overall system.

- 1 Pulsonix preparation of layout
- 2, 5 Force-displacement supervised pressfit technology
- 3 Thermal simulation for application optimisation
- 4 Control via graphical user interface



Competences in Software

For the firmware development, E-T-A also uses operating systems such as Linux and programming languages such as Python, C++ etc. It is our goal to allow ease of integration and activation of »functions« from other applications. For this purpose we use the corresponding preferred processors or processor groups. At the same time E-T-A works with open source programmes. For details please see www.e-t-a.de/open_source

We use agile work methods allowing us to interactively design the software in close co-operation with our customers. This and the use of software tools enable the customer to receive his E-T-A systems much faster and also more favourably priced than proprietary systems. For internal device communication E-T-A uses the »ELBus«, our in-house bus protocol for optimised communication of the E-T-A components with each other.

E-T-A takes system tests very seriously. They are automated, standardised and based on the system surroundings, programmed with LabView. Such a standardisation significantly reduces the time required by system tests for customer applications.

E-T-A customers will exactly receive the communication interfaces which are prevalent and expedient for their application. Likewise all relevant bus protocols can be included in E-T-A solutions:

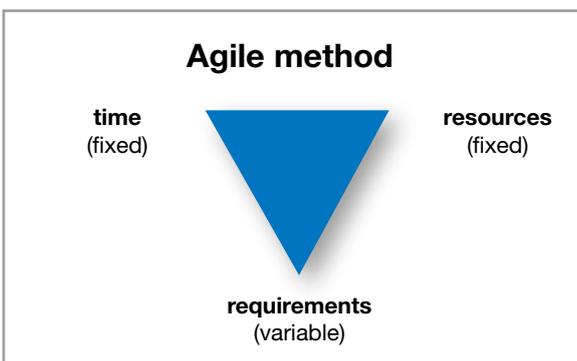
- **System technology in industrial applications:**
e.g. I/O Link, MOD, ProfiNet, Profibus DB
- **System technology in telecommunications:** e.g. SNMP, MOD

For a quick diagnosis or as a stand-alone solution, E-T-A also provides GUI-controlled web browser usage (graphical user interface) for some applications. It allows remote monitoring and control, reducing service expenses significantly.

Software

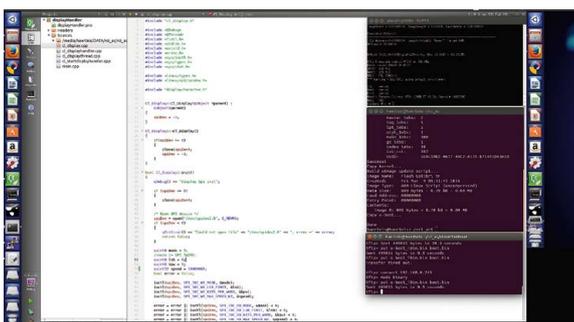
Your benefits

- E-T-A systems are available faster and more cost-effective than proprietary systems.
- Standardised system tests significantly reduce the time required for system tests.
- E-T-A customers receive just the communication interfaces which are expedient for their application.



On the score of firmware design E-T-A works with

- **Linux®**
- **Python®**
- **C++®**
- **PROFINET®**
- **Ethernet/IP®**
- **ELBUS®**



Software preparation and standardised software tests



Application-specific GUIs

E-T-A

A globe-spanning network



Europe

- Belgium
- Bosnia/Herzegovina
- Bulgaria
- Denmark
- Germany
- Finland
- France
- Ireland
- Italy
- Croatia
- Luxemburg
- Macedonia
- Montenegro
- Netherlands
- Norway
- Austria
- Poland
- Portugal
- Russia
- Sweden
- Switzerland
- Serbia
- Slovakia
- Slovenia
- Spain
- Czech Republic
- Turkey
- Hungary
- United Kingdom

America

- Argentina
- Brazil
- Chile
- Canada
- Mexico
- USA

Asia

- Brunei
- China
- Hong Kong
- India
- Indonesia
- Japan
- Korea
- Malaysia
- Philippines
- Singapore
- Taiwan
- Thailand

Africa

- South Africa
- Tunisia

Oceania

- Australia
- New Zealand

