Issue **2/2016**

current

Customer Magazine of E-T-A Elektrotechnische Apparate GmbH

E-T-A®
ENGINEERING TECHNOLOGY

The one and only!

Electronic circuit breaker for energy security in UPS operation

The final score is tallied at the end.
E-T-A as a solution supplier
3

REX12 – the family grows!
Electronic circuit protector for DC 24 V protection
4-5

The one and only!
Electronic circuit breaker for energy security in UPS operation
6-7

Safety under water
E-T-A Smart Power Relay E-1048-8I unites many functions
14

©photographmd/Fotolia.com

©LuckyImages/Fotolia.com

©Tom Kimmeck/Fotolia.com

4-5 ***REX12 – the family grows!***
Electronic circuit protector REX12-T for DC 24 V protection

6-7 ***The one and only!***
Electronic circuit breaker for energy security in UPS operation

15 ***Culinary delights***
Typical Asian: »Chicken Nasi Goreng«

Contents

3 **Editorial**
The final score is tallied at the end.

4-5 **REX12 – the family grows!**
Electronic circuit protector for DC 24 V protection

6-7 **The one and only!**
Electronic circuit breaker for energy security in UPS operation

8 **Interview**
Safety in the tunnel
The Swiss Elektro-Bau AG relies on E-T-A products in their protection systems.

9 **Personnel**

10 **FAQ**
Frequently Asked Questions

11 **Good Practice**
Just plug it in - done!

12-13 **E-T-A solutions for many products**

14 **Safety under water**
E-T-A Smart Power Relay E-1048-8I unites many funtions

15 **Culinary delights**
Typical Asian:
Chicken Nasi Goreng

Impressum

Customer Magazine of E-T-A
Elektrotechnische Apparate GmbH

Editor:
E-T-A Elektrotechnische Apparate GmbH
Industriestraße 2-8 · 90518 ALTDORF
Phone: +49 9187 10-0 · Fax +49 9187 10-397
E-Mail: info@e-t-a.de · www.e-t-a.de

Responsible:
Thomas Weimann

Layout:
E-T-A
Communications Department

Photos:
E-T-A, Cover: ©LuckyImages/Fotolia.com,
Back: industrieblick/Fotolia.com

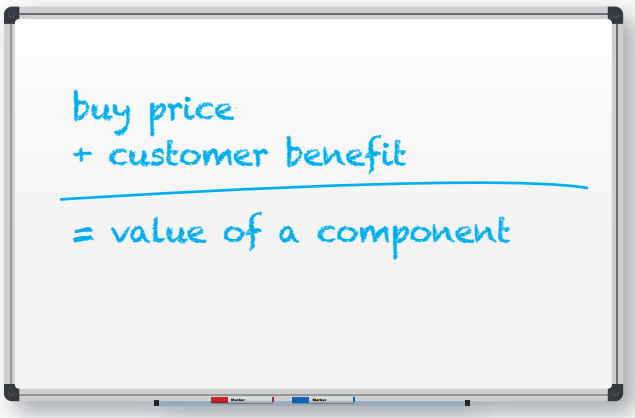
The final score is tallied at the end.

Not only the price determines the value of a component.
Price pressure, price pressure, price pressure. This seems to be the central issue in design. At the same time, exclusively focusing on price neglects a comprehensive and well-structured view on the final product. Often, astute component selection can significantly increase the benefits and appeal of a product to the market. The pure material costs quickly fade into the background because of the increased reliability and additional features provided by the individual components.

Smart products, like E-T-A's EBU or the ESX10 and REX12 electronic overcurrent protection devices, offer tangible benefits to the user. This is even more the case when comparing them with MCBs that are cheaper at first sight. Enhanced system availability or significant space-savings at only nominal extra costs are advantages that may convince prospective customers very quickly. The 3120 thermal circuit breakers is also a great example. These devices combine two customer benefits - switching and protecting - into a single unit. Otherwise such requirements could only be met with a far clumsier solution consisting of a switch and an extra fuse. The combination of circuit breaker and switch facilitates electrical design and assembly. The 3120 reduces wiring efforts, the number of mounting holes and the number of components required.

This is also true for vehicles: an E-T-A circuit breaker may be more expensive than a standard blade fuse. However, if you consider the entire life cycle of the vehicle and the system costs, you will very quickly recognise the benefits of our products. What is the additional cost of a circuit breaker compared to the costs caused by productivity standstills and downtimes of utility vehicles? In the end, the installation of high-value products delivers enhanced safety and reliability and actively contributes to the manufacturer's brand reputation. Do you have any current projects or tasks concerning protection or power distribution? **Talk to us! We look forward to speaking with you.**

Dr. Clifford Sell
Executive Committee
E-T-A Elektrotechnische Apparate GmbH



This is our equation to offer you customised solutions, tailored to your needs.

©kir_prime/Fotolia.com

*Electronic circuit protector **REX12-T** for DC 24 V protection*

REX12 – the family grows!

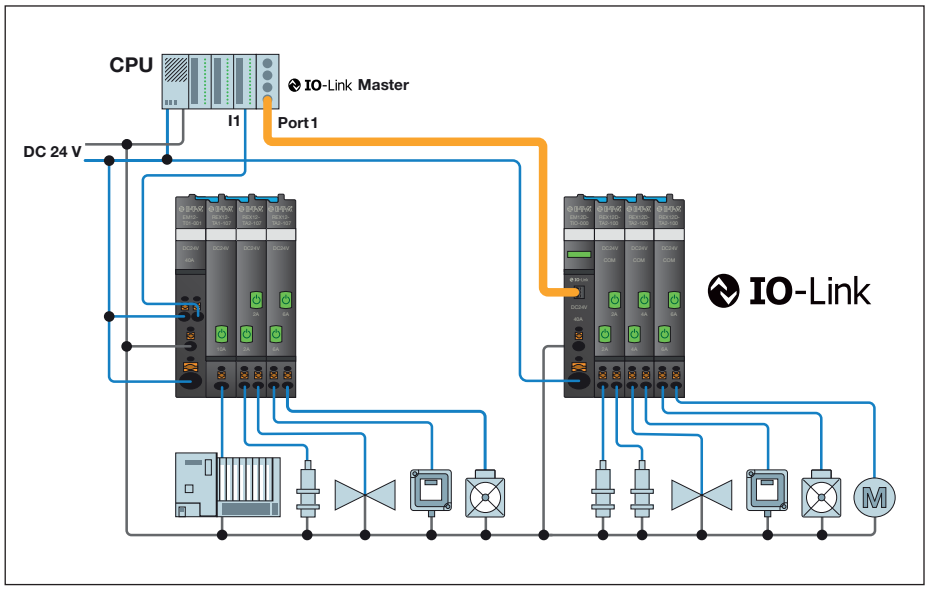
A variation of the electronic circuit protector **REX12** -
a new 2-channeled model with **IO link** is now available.

IO-Link

***REX12D-TA1** electronic circuit protector with **EM12D-T01** supply module*

The **REX12-TA1** was designed to meet the requirements of the machine construction industry. There is very stiff competition in this sector which forces companies to continuously create new innovations at very low prices. E-T-A designed the new **REX12-TA1** to meet the special requirements of this industry and help our customers remain competitive. It features an state-of-the-art connection and mounting technology that combines the advantages of track-mountable products with the flexibility of plug-in type circuit protectors. This degree of flexibility allows customers to mount and remove the devices quickly and easily. Individual protectors can easily be replaced, enabling adjustments to changing machine configurations. This leads to significant time-savings and helps cut installation costs enormously.

The **REX12** family grows with the addition of the 2-channeled **REX12D-TA2** with communication capability. The **REX12D-TA2** does not only save space in the control cabinet - two electronic circuit protectors are accommodated in the same width - but it also offers a corresponding cost benefit for the customers. E-T-A's machine construction customers can take advantage of a clear competitive edge, because the **REX12-T** offers unrivalled flexibility with no additional accessories required. However, the machine building industry cannot be considered a homogeneous structure. There is a great number of varying requirements and applications. Besides the ever growing demand for flexibility and compact sizes, the transparency of machines and the knowledge of their actual state are getting more and more important. The latter is now available by connecting the components to an **IO link** communication system. This is particularly suited to the requirements of the machine construction industry and allows reading of measuring values and writing of parameters onto devices.



The innovative flap-hinged mechanism makes connection of the individual devices as easy as can be. No bridges, jumpers or busbars required.

Your benefits

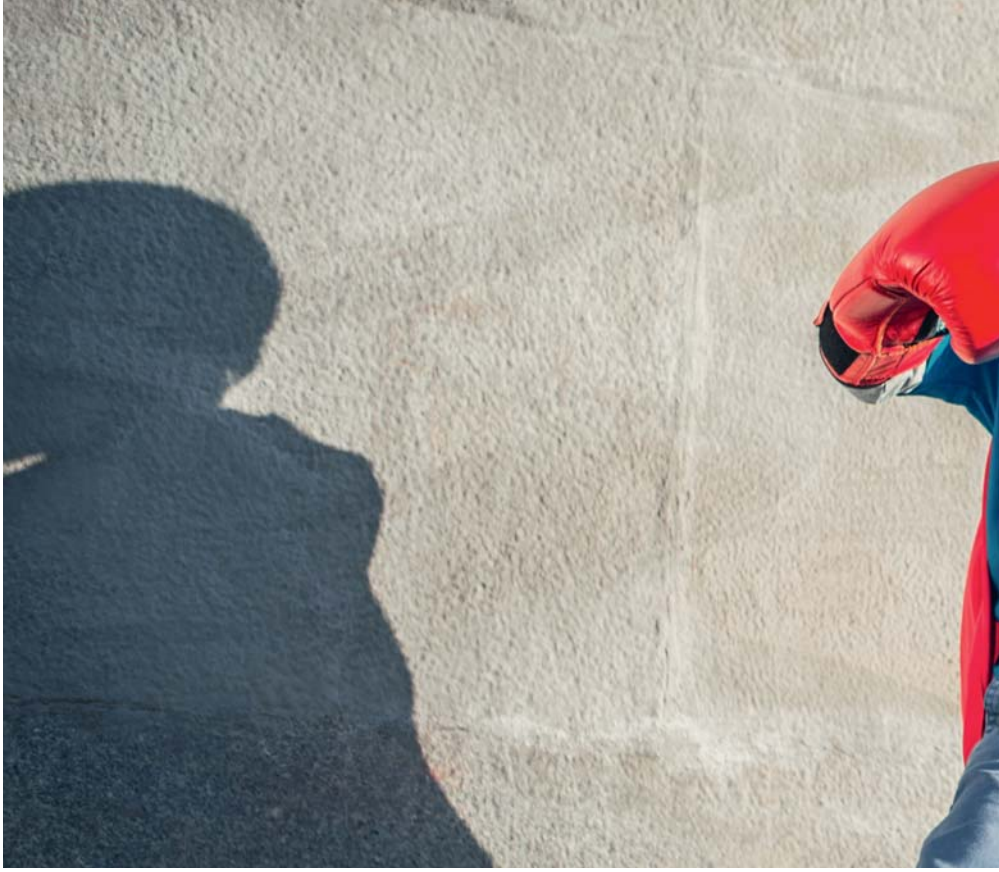
- **Saves cost –** no further accessories required
- **Saves time –** through innovative and flexible mounting and connection technology
- **Saves space** – with a width of only 6.5 mm or 12.5 mm per channel
- **Provides flexibility** – through ease of mounting, disassembly and modular design
- **Increases machine availability** – through light transparency and diagnostic functions

To do this, E-T-A will not only offer the conventional **EM12-T01** supply module with the **REX12-TA1** and **REX12-TA2** electronic circuit protectors, but also a smart version. It will provide customers with an overview of the current state of his machinery and its DC 24 V supply. Any changes in the machine behaviour, an increase in current consumption of individual components or a failure of machine parts, will be detected and signalled at a very early stage. This allows machine operators to respond quickly, thus reducing system downtimes.

The new **REX12** portfolio offers a complete package to E-T-A's machine construction customers and will meet their specific requirements. The flexibility and the innovative connection technology will help minimise time and costs. In combination with the communication capability of the **REX12**, this will increase machine transparency, leading to a significant rise in availability.

More information? Just scan the QR code!

©photographmd/Fotolia.com



Electronic circuit breaker for energy security in UPS operation

The one and only

Energy security plays a major role in industry today and is extensively discussed. In the event of a power failure, or fluctuations uninterruptible power supplies (UPS), energy security is ensured through battery power. They protect against data loss. Unfortunately not always.

The solution for reliable energy security:
EBU electronic circuit breaker

Why MCBs do not trip when UPS systems run on battery power

Besides high investment costs, the available output power of UPS systems is very limited for technical reasons. Uninterruptible power supplies limit the maximum current for the sake of self-protection. Therefore, only a limited overcurrent is possible in battery mode. The voltage will first be minimised in the event of an overload.

When a short circuit causes an extremely high load, the maximum load limit of a UPS is exceeded very quickly. The entire UPS unit will switch off to protect itself. Good-bye energy security! In the event of a single faulty load circuit the “lights will go out” also for all other loads. Overcurrent protection that does not trip when battery-powered does not offer any added value.

Often conventional MCBs are used. These devices only respond after several minutes or not at all. This is because the conventional protective element requires a very high trip current. Trip current C10 A breaker = 100 A. A UPS does not provide a current this high.

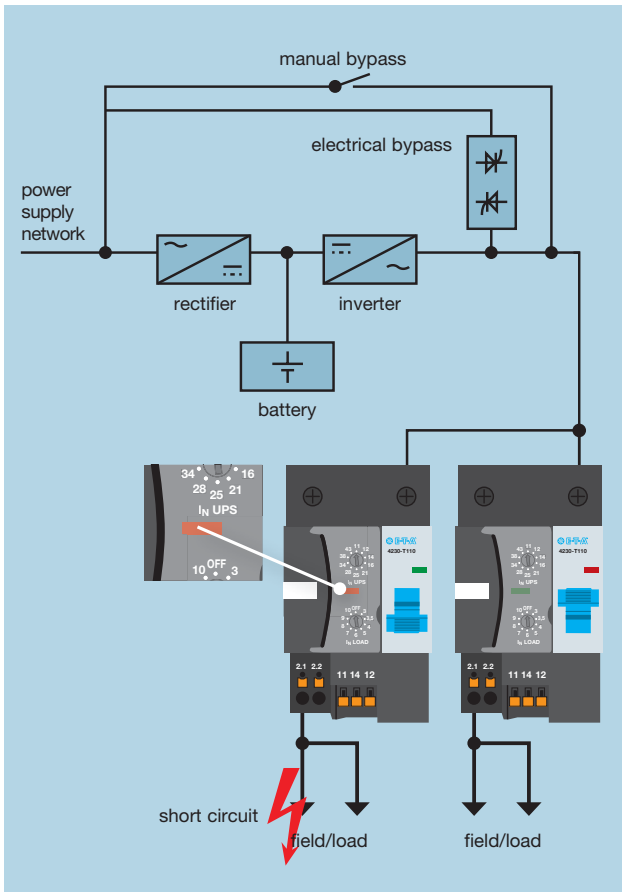
This example demonstrates a UPS unit alone cannot ensure energy security. An investment in this type of system is justified to a limited extent. Only a UPS unit which really offers energy security is worth its while in the event of a failure.

The solution for reliable energy security

E-T-A’s new EBU circuit breaker is the first device to ensure reliable and stable supply of UPS equipment. The device for AC 230 V consists of an MCB to EN60947-2. It is approved for short circuit disconnections up to 10 kA. The second element is an

©Luckyimages/Fotolia.com

add-on electronic circuitry to EN60950-1 for measuring and evaluation functions. If the electronic control unit identifies a short circuit or overload, the device will disconnect via the MCB. The product is available with the typical MCB ratings 6 A, 10 A and 16 A with B and C characteristics and is directly operated at the output of the corresponding UPS. The EBU is 54 mm wide. It can be adjusted to the actual load conditions and the capability of the UPS unit in question with an adjustment potentiometer in 10 steps. It will reliably trip in the event of a failure. And it will only disconnect the affected load path. All other paths will remain unaffected. The EBU unit tolerates switch-on operations and the corresponding high inrush currents. The user benefits from faultless operation and significantly reduced costs.



*The **EBU** reliably trips in the event of a failure and only disconnects the faulty load path. All other supply strings will remain unaffected.*

Size reduced by one third

A user can reduce the size of the UPS by one third which can reduce annual energy costs by approx. 40 percent. The EBU will pay off in no time and also provides enhanced system availability. For the first time, energy security is guaranteed and the investment in a UPS unit is really worthwhile.

Your benefits

- **Enhanced system availability -** through effective protection
- **Reduction of overall costs** through a more effective size by 1/3 – **1.000 € already in the first year**
- **Easy planning** through variable overcurrent protection

At a glance – EBU circuit breaker

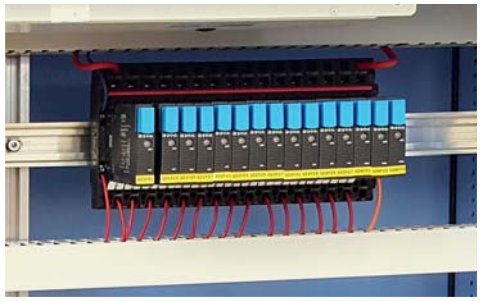
- Voltage rating: AC 230 V
- Current ratings: 6 A, 10 A and 16 A
- Characteristic curve: B and C
- Temperature range: -25 °C…+60 °C
- Width: 54 mm
- Terminal design:
  - Input: Screw terminals
  - Output: Push-in technology
- Mounting: DIN rail

©trendobjects/Fotolia.com

The Swiss Elektro-Bau AG relies on E-T-A products in their protection systems.

Safety in the tunnel

»Focus on electro-technics« is the motto of Elektro-Bau AG in Switzerland, a reliable partner for high-tension and low-tension installations, communication systems, switchgear and tailor-made custom-built solutions. We talked to Konstantinos Noulas, Project Manager in the business field of switchgear, about the use of electronic circuit breakers.



*Electronic circuit breakers **ESS20** in service*

Current: You have been using E-T-A's ESS20 electronic circuit breakers for several years to protect DC 24 V control circuits. What is the actual application?

Konstantinos Noulas: We have used the ESS20 for some years now particularly in tunnel construction on the motorway A9 in Visp in the canton of Valais. The devices are installed in centralised control cabinets as well as in decentralised power distribution systems on the side channels for service, maintenance, emergency systems etc. The ESS20 protects all DC 24 V loads such as the control unit and complete periphery distribution for illumination, ventilation and emergency power supply.

Current: What criteria made you choose the ESS20?

Konstantinos Noulas: The building owner, the »Canton of Valais«, specified the ESS20 electronic circuit breakers because there are extremely strict safety requirements for the 7.5 km long motorway tunnel. The deciding factor included the ESS20's genuine physical contact isolation in the event of short circuit or overload. In addition, the ESS20 ensures reliable disconnection of an overcurrent within 5 seconds, unlike a standard MCB, even in the event of long load lines with high cable attenuation. There will be a prompt message to the control unit, allowing targeted trouble-shooting carried out by the maintenance staff. The ESS20s are generally used everywhere in the canton of Valais in all tunnels and the same material is used in all distribution systems.

Current: The ESS20 can be plugged into the power distribution Module 17plus system. What are the benefits of this system?

Konstantinos Noulas: The Module 17plus allows us to create various sizes of power distribution systems quickly and flexibly. The plug-in design of the ESS20 allows us to adjust the current rating from 2 A to 4 A in the event of higher current demand, e.g. when installing additional illumination options.

Current: Thank you for your time.

PERSONNEL

"People are at the very center of our daily work"

Therefore we are excited to introduce new colleagues, new jobs, new contact people at E-T-A on this page.

Witali Juferow

In Mid-2015 Witali Juferow joined the German sales force as a Regional Sales Manager for the south-western German federal states Hessen, Rheinland-Pfalz and Baden-Württemberg. He is a trained electronics engineer for energy and building technology and a technician of power electronics and has a wealth of experience in selling technical product. It is Witali's goal to offer our customers the best possible support of the entire E-T-A product range. He is ready to design tailor-made protection solutions together with the customers for their applications.

Bernd Rösch

Bernd Rösch is the new head of the Transportation Division at E-T-A. He is a graduated industrial engineer and worked in the automotive and electronics industry for many years in responsible positions in product management, marketing and business development. He has great knowledge in business field development and international sales of complex technical products. It is his goal to push the target group oriented market development at E-T-A. Customised solutions and products shall continue to inspire E-T-A's customers all over the world.

Andrew Skaltsounis

Andrew Skaltsounis returned to E-T-A's Australian subsidiary as Managing Director in August 2014. He has a great understanding of electrical engineering and the application level of our products. In addition, he has a wealth of experience in sales and business development and managing an organisation. Andrew Skaltsounis established our subsidiary in Australia in 2005. From 2011 to 2014 he expanded his experience, working as the Managing Director for Inventis Technology. We are very happy that Andrew is back and together we will develop the markets in Australia.

FAQ

Decentralised power distribution for DC 24 V systems

»Centralised or decentralised?«

What are the major criteria for a system design?

Our FAQ column discusses topical and practical subjects to support you in your daily work. Do you have any questions you need answer to? Send it to us - we are looking forward to hearing from you.
E-Mail: faq@e-t-a.de

Generally the question is more and more often whether protection of installation engineering in production facilities should be done directly on site in a control cabinet or in a remote control room. There is more than one answer to this question. We would like to take this opportunity to make a few recommendations that might be helpful when planning "decentralised power distribution units for DC 24 V systems".

What is the best housing design?

In many applications, a clear production layout is a major deciding factor. The system must be fully functional even with the control cabinet doors open. The housing design influences whether maintenance-free heat dissipation is possible or not. Suitable measures include:

- **Metal side walls**
- **Separation of heat sources**
- **Peltier cooling elements as additional forced cooling**

Why is the simulation of the thermal conditions important?

Temperature distribution simulation calculates the best length-width ratio of the control cabinet and the best possible component layout. A thermo-graphic procedure helps check if reality and simulation are in-line. This ensures the safety of man and machine in real life situations.

What are the advantages of a modular design?

Modular design is an essential principle in trend-setting developments. Components, such as E-T-A's 18plus power distribution module, help route the plus supply as well as the minus return conductor in one module. Decentralised power distribution units support efficient planning of production areas and significantly reduces planning cycles.

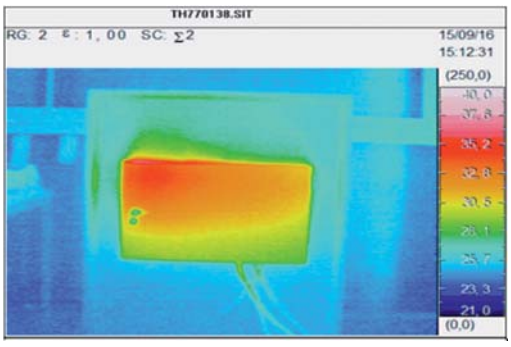
What does an FMEA[1] mean for our systems?

FMEA is used as a preventive tool to avoid failure and increase technical reliability. It rates the failure probability of possible product failures in order of importance for the customer with a key figure. This method is mainly used in the design stage of new systems and processes. It does not only focus on the evaluation of components. It reviews the entire "decentralised power distribution for DC 24 V systems".

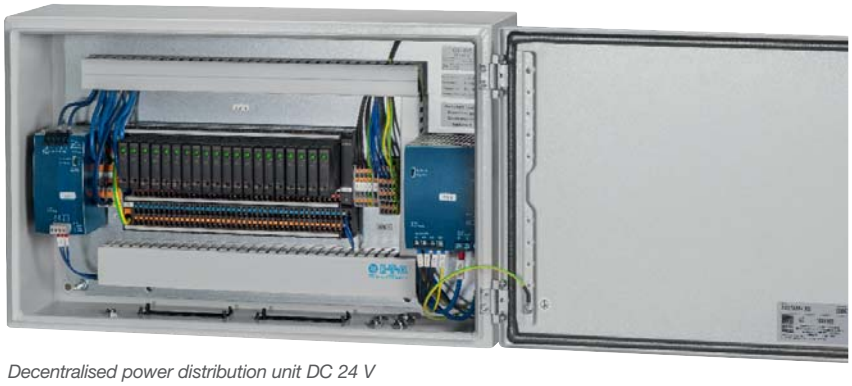
What do MTBF[2] and MTTF[3] mean?

The MTBF value is the average operating duty between failures for repaired units. The operating duty is the operating time between two subsequent failures. This tells us very little about the typical life of power distribution units. MTTF is the average operating time until failure and is also known as mean life span.

[1] **FMEA** Failure Mode and Effects Analysis
[2] **MTBF** Mean Time Between Failures
[3] **MTTF** Mean Time To Failure



Thermal imaging: *imaging method to indicate the surface temperature*



Decentralised power distribution unit DC 24 V

Thomas Schmid,
Product Manager, Industry, Energy & Equipment Division at E-T-A

Wiring of circuit breakers made easy

Just plug it in - done!

E-T-A is the first manufacturer in the world to launch a circuit breaker/switch combination with push-in connection technology – the **3120-PT**. This design ensures quick, easy, secure and reliable connection of conductors.

E-T-A's 3120 circuit breaker is one of the best-selling devices in E-T-A's product range for years. Its robust design makes it ideal for many applications including: medical equipment, professional tools, household appliances, apparatus and machine construction.

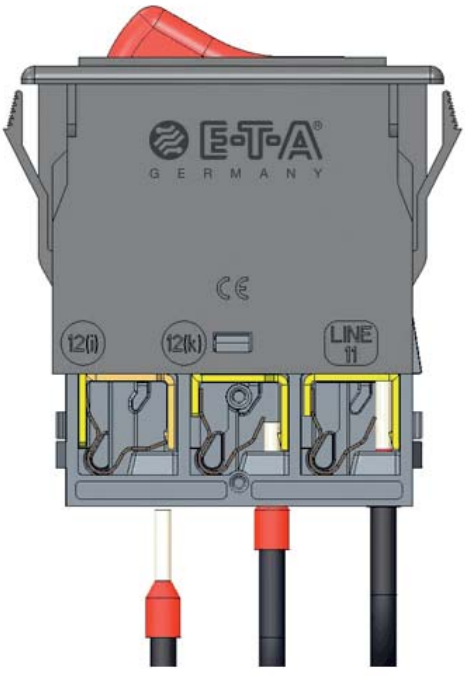
New: Push-in terminals optimise wiring
For ease of wiring, E-T-A's well-proven 3120 is now available with push-in terminals for direct cable connection as an alternative to standard blade or screw terminals. This means: rigid cables or cables fitted with wire end ferrules can be plugged directly into the terminal without any tools. The conductor automatically opens the contact spring when it is pushed in and provides the necessary force to press the conductor against the current bar.

Saving time and money: plugging in the conductor without a tool

Long-term stable and vibration-proof contact
Due to the consistently high spring forces within the terminal, the push-in connection technology ensures secure contact of the conductor over a long period of time. The connection will withstand harsh shock and vibration conditions due to the high surface pressure of the contact spring made of a special spring steel. This makes the 3120-PT ideal for applications like core drills or laboratory centrifuges.

Simple plug-in design saves time
Another advantage of the push-in connection technology is that the conductors are easy to plug in. They only require half of the push-in force compared to conventional spring-loaded terminals which helps prevent work fatigue in production. Unlike blade terminals, "plug-in orientation" does not need to be considered. **This also helps save time and money.**

And last but not least: Push-in terminals provide protection against brush contact.
As long as the cables are stripped correctly and/or the recommended wire end ferrules are used, the new push-in terminal for the 3120 offers 100% protection against brush contact. Hazardous electrocution is completely prevented.



The contact spring is automatically pushed back by the conductor

E-T-A solutions for many products

E-T-A offers tailor-made developments for all industries and products.

Here are some interesting examples.

E-T-A type used: *Circuit Breaker/Switch Combination 3131*

Switching and protection on boats

philippi elektrische systeme gmbh, located in Remseck on Neckar, is a specialised supplier of electrical systems in motor and sailing yachts. Power distribution switch panels is one of their major product groups. Besides numerous standard versions, philippi also sells water-tight distribution boxes for the outside area of boats.

The name philippi is a synonym for professional electrical systems used in watercraft. Their product range spans all the products required for a reliable electrical supply and distribution on board: From batteries and chargers to power management boxes to entire shore-power connectors and distribution switch panels. They are perfectly matched and together form the well-proven "philippi on-board system". philippi fully relies on E-T-A's 3131 rocker actuated thermal circuit breakers in their special water-proof distribution rails for the exterior area. The 3131 features an IP66 protection degree in the operating area making them the ideal solution for this application. Users also have the choice of rocker colours, a huge selection of legend symbols and various types of illumination.

E-T-A type: 3131 circuit breaker

Foto: philippi elektrische systeme gmbh

E-T-A type used: ControlPlex® Rack

Intelligent protection

Avacon AG, located in Helmstedt, is one of the region's major energy service providers in Germany.

Avacon's network area reaches from the North Sea Coast to the south of Hesse and covers 55,000 square kilometres of high, medium and low voltage lines of some 66,000 km length as well as a natural gas network longer than 20,000 km. The communications engineering and transmission sector controls the energy networks and for data communication. The information is transmitted with their own ultramodern fiber optic technology. Avacon selected E-T-A's ***ControlPlex®*** **Rack** intelligent system with **ESX300-S** electronic circuit protectors to protect this technology. They also selected an an optional control interface sub-assembly type **RCI10** which can be extended in operation without shutting down the protected systems. The advantages of the ***ControlPlex®*** **Rack** system include: compact, user-friendly system design, and safe, fast and selective disconnection of defective components in the event of a failure. Moving forward, the smart aspect of this solution, will become more and more important such as the energy consumption data recording and the remote control and automation with the **RCI10** sub-assembly.

E-T-A type: ***ControlPlex® Rack***

©Foto: Avacon AG

E-T-A products increase the efficiency of remotely controlled submarine vehicles in the oil industry

Safety under water

Subsea Explore Systems SDN Bhd, in Malaysia, uses **E-T-A's E-1048-8I smart power relay** in their remotely controlled submarine vehicles.

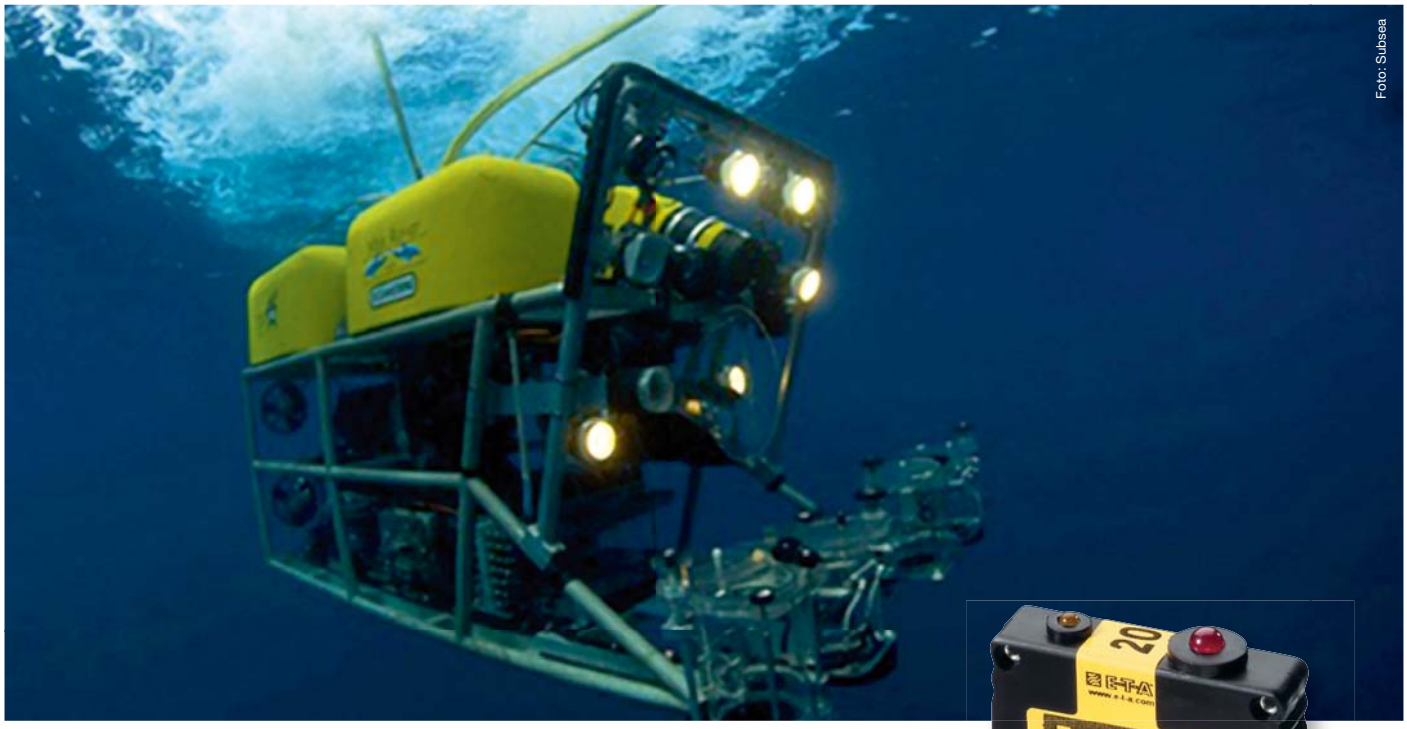


Foto: Subsea

Remotely operated vehicles of Subsea Explore: improved performance through E-T-A products.

E-T-A's E-1048-8I Smart Power Relay

Subsea Explore Systems was founded in 2005, and has constantly grown since then and offers various services for the oil and gas industry. They also provide maintenance and inspection services in the offshore areas carried out by ROVs (remotely operated vehicles).

Up to now these submarine vehicles were fitted with standard blade fuses mounted in a special water-tight power distribution box with the relays and other components. This solution forces the user to replace the blade fuse in the event of a failure. If the failure occurs during a dive, the submarine must interrupt the dive and go up. Of course, this causes extremely high cancellation expenses. Therefore, Subsea Explore Systems decided to re-design the power distribution box and use the E-T-A's **E-1048-8I** smart power relay.

The **E-1048-8I** is a remotely controllable electronic relay and holds three functions in a single device:

- Solid state relay
- Electronic overcurrent protection
- Status indication and diagnostic functions

It allowed the Subsea engineers to solve several problems at once. The E-T-A relay offers the above mentioned three functions. This helps eliminate other components and the related wiring. It also helps saving space. In addition, the failure risk due to uncritical failures is significantly reduced. The **E-1048-8I** protects the system in the event of an overcurrent, but can be remotely reset. Additional features, such as status indication or wire break monitoring, also add value to the device.

30 **E-1048-8I** solid state relays help save valuable space in the power distribution box in each ROV of Subsea Explore Systems. System protection is improved, downtimes are minimised and the customer enjoys better remote operation of the submarine vehicle.

CULINARY DELIGHTS

Typical Asian:

»Chicken Nasi Goreng«

Nasi goreng is a typical dish in Malaysia and Indonesia and the literal translation means "fried rice".

Traditionally it is often eaten as a warm breakfast when left over from the day before. There is a wealth of recipes for Nasi Goreng, but there is one invariable ingredient: the rice is always cooked beforehand and is left to stand for at least two hours.

Directions

Cook the rice and put aside. Clean the vegetables, cut into bite-sized cubes. Chop onions and garlic, peel ginger and cut into slices. Cut chicken breasts into slices. Mix egg, sambal oelek, chili sauce, soy sauce with curry, salt and pepper.

Heat 1 tsp oil in a nonstick frying pan and fry the sliced chicken breasts. Remove from pan and keep warm. Put ginger and garlic in the pan and sauté. Add red pepper, carrot, onions and leek and fry for another 2 minutes. Finally add the zucchini and sauté as well. Remove the vegetables from pan and keep warm. Heat remaining oil in the pan and fry the rice. Add meat and vegetables and at the end pour the egg mixture over it. Season with salt and pepper to taste and serve immediately.

Prep time: approx. 30 minutes.

Ingredients for 2 servings:

- 2 skinless chicken breasts
- 1 carot
- 1 red pepper
- 1 zucchini
- 1 leek
- 2 onions
- 1 garlic clove
- 30 g fresh ginger
- 2 tsp peanut oil
- 1 egg
- 120 g basmati rice
- 1 tsp sambal oelek
- 2 tbsp light soy sauce
- 1 tbsp chili sauce
- 2 tsp curry powder
- salt, pepper

©BBB3/Fotolia.com
©Tom Klimmeck/Fotolia.com

Skilfully coupled

User-friendly – that's exactly what it is:
The new electronic circuit protector **REX12-T.**

A smart design helps you combining single-channeled devices at record speed and **no tools or accessories required.** It all adds up to a tailor-made DC 24 V protection for your system.

Electronic protection by means of the REX12-T:

- saves time and cost through ease of mounting
- is the ideally rated fail-safe element
- provides transparent planning

Talk to us! We look forward to consulting you.
www.e-t-a.de/cu_e1-16

E-T-A ENGINEERING TECHNOLOGY

E-T-A Elektrotechnische Apparate GmbH
Industriestraße 2-8 · 90518 ALTDORF
GERMANY
Phone +49 9187 10-0 · Fax +49 9187 10-397
E-Mail: info@e-t-a.de · www.e-t-a.de