



Staying flexible

Changing current ratings made easy:
The REX12D-TE2 electronic
DC 24 V circuit protector

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E-T-A is at the service of its customers all over the world

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Robust, economical and smart

MPR10, MPR20 and HPR10 electro-mechanical power relays

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Impressum

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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 Communication Department

Photos:
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Why you can trust the E-T-A brand

E-T-A is at the service of its customers all over the world

If you flip through this new issue of Current, E-T-A's customer magazine, you will see once again E-T-A's passion for engineering by how we design, manufacture and sell our products. Whatever the target product or target industry is, our application specialists make sure that E-T-A's products perfectly match the application's requirements. You will receive exactly the safety and reliability you expect from our products – without question.

And as an E-T-A customer you know: We offer more than technically superior solutions. E-T-A is a strong and reliable partner, from customer service to purchasing, from delivery to after-sales services.

You need to rely on your partners, especially when selecting safety related products. Only then can you choose your products without worrying. E-T-A is a strong brand that assures you that you're not taking any risks. Your customers rely on you, on your products and on each and every component installed in these products.

Therefore, we work closely with our customers around the world to develop confidence in E-T-A's work. It is our mission to consistently protect the lives and values of our customers and for seven decades already, we have been taking this mission very seriously. And we will do so in the future.

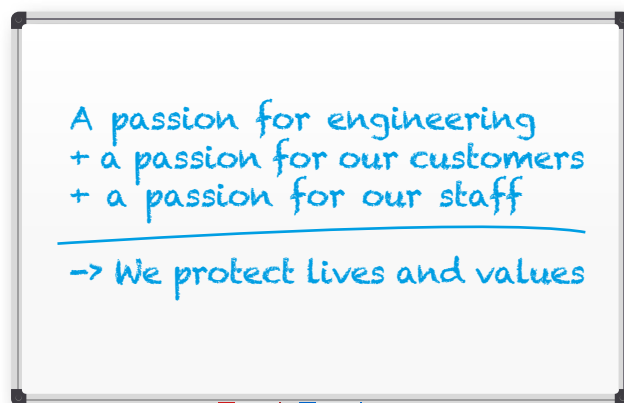
What can we do for you? Please get in touch. Or do you know of a certain project you wish to discuss with us? **We look forward to speaking with you.**



Dr. Clifford Sell

Executive Committee

E-T-A Elektrotechnische Apparate GmbH



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

MPR10, MPR20 and HPR10 electro-mechanical power relays

■ Robust, economical and smart

E-T-A's electro-mechanical power relays, with up to 300 A continuous current, ensure reliable and economical operation of utility vehicles. Very soon, E-T-A is extending its well-proven bistable relay product series that includes the **MPR10** and **HPR10** with a new monostable **MPR20** relay.

Unrivalled robust and reliable design

Absolute robustness and reliability are prerequisites for relays that must withstand the harsh conditions in the utility vehicle industry. With this in mind, E-T-A designed its power relays according to ISO 16750. They are approved by the German Federal Office for Motor Traffic with the E1 logo. This confirms they meet the highest corrosion resistance, humidity, temperature fluctuation, condensation, shock and vibration requirements.

Minimal energy consumption and minimal life cycle costs – MPR10/HPR10

The **MPR10** and **HPR10** bistable relays have very low power consumption. Standard monostable relays require more than 10 W continuous power, because the coil must be constantly energised in the

ON condition. The bistable principle does not require a holding current. Only the switching operation consumes energy.

During continuous operation, fuel consumption is reduced by approximately 20 litres per year per vehicle. This is very important for buses and trucks.

Minimal space requirements and easy integration

The housings of E-T-A's power relays do not have a metal pot, despite its similar design, they consist of completely fiber-reinforced moulded material. Along with other design improvements, this reduces the overall volume by approximately 20 to 40 percent. It also reduces the weight by more than 50 percent compared to similar competitive devices. Integration

into a vehicle's system is easy because of its range of mounting methods and low heat creation.

Intelligent control functions without changing the control unit – HPR10

The **HPR10** hybrid power relay is based on the **MPR10** bistable relay and includes integral electronic circuitry making additional intelligent functions possible.

Timer functions (ON delay, OFF delay, pulse output) are possible without changing the central control unit. Optional undervoltage or overvoltage monitoring helps protect the battery against deep discharge through load-shedding. Even uncontrolled voltage levels or an open control input, for example because of wire break, can be detected. A signal filter,



which is also configurable, tolerates peaks or contact chattering and helps avoid inadvertently connecting or disconnecting the load.

Ease of configuration

You can easily configure the **HPR10** with E-T-A's online Relay Configurator. Explanations of the configuration options help with the selection of possible hardware and software configurations.

The relay configuration is easy to accomplish. It also helps avoid transcription errors during the ordering process. After submitting your enquiry, you will receive a complete description of the product via e-mail.

Minimum power consumption, optimum control – MPR20

The new **MPR20** combines the advantages of a bistable and a monostable design in one relay. By a targeted activation of the coil, power consumption is limited to 2 W continuously. This reduces the power consumption by approximately 80 to 90 percent compared to conventional monostable relays. However, it still features the well-proven reliable and simple behaviour of monostable relays.

The **MPR20** has a very low current draw compared to a dual coil relay so it can still be directly activated by the controlgear. Installation space, weight and other properties of the **MPR20** are almost identical to the **MPR10** and **HPR10**. It is scheduled for full release in August 2019



MPR10 and HPR10 bistable power relays



MPR20 monostable power relay



Getty Images/Stockphoto



Superngostock.adobe.com



REX12D-TE2 electronic DC 24 V circuit protector

■ Staying flexible

Adjustable circuit protectors can significantly enhance the flexibility of DC 24 V power supplies in machines and panel building.

Operation of CPUs, I/O modules, motor and drive controls, IPCs, monitors and touch panels, bus couplers and decentralised periphery, DC 24 V motors, magnetic valves as well as actuators and sensors is accomplished with a DC 24 V supply. Electronic circuit protection devices are appropriate for selective protection. These are specified directly to the characteristics of the various loads and were designed for this type of power supply. Besides functionality, economic efficiency and adjustability of the protection solution play a key role. The modular solutions offers flexibility and system scalability. They allow adjustment to constrained space conditions. The requirement of flexibility also implies variable adjustability of the component's current rating. This offers additional cost and space savings, for instance in

inventory management. It allows users to operate the entire current rating range with a single device.

The new **REX12D-TE2** electronic overcurrent protector is very flexible. It features adjustable current ratings from 1 A to 10 A in 1 A increments. Its flexibility is combined with a slim design of only 6.25 mm per channel. It meets the technical requirements and economic expectations of the machine construction industry. In addition - as with all **REX12** models - no additional accessories are required to mechanically connect the individual components. The easy mounting and reduction in wiring time also helps save time and money.

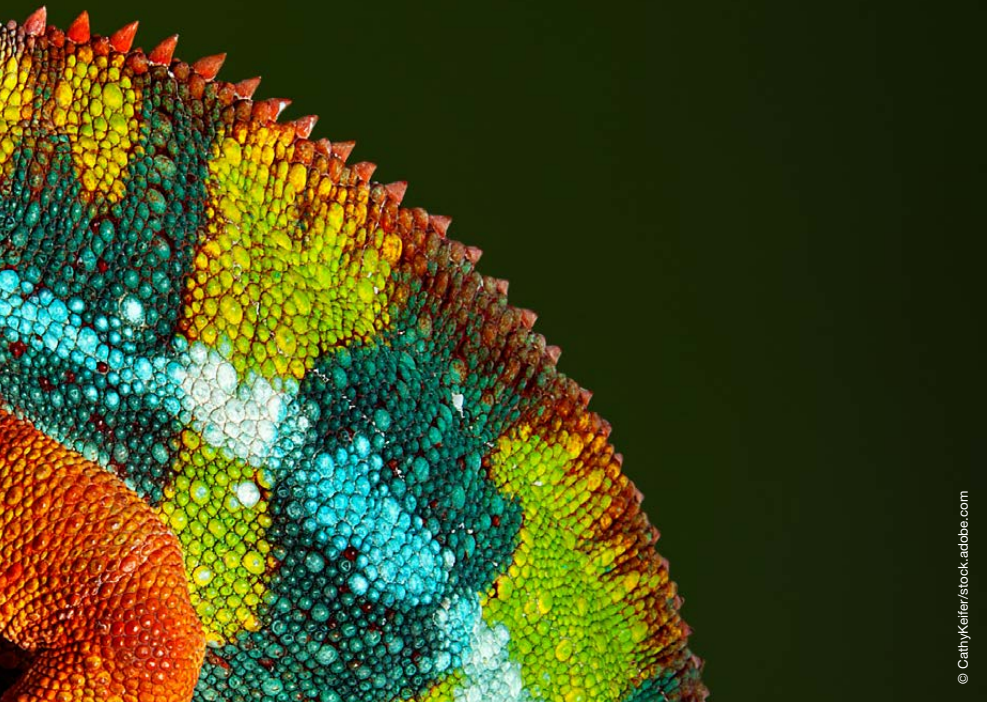
One type for all applications

The **REX12D-TE2-DC24V-1A-10A** can

be operated with the standard **EM12-T** supply modules or the intelligent **EM12D-T** (IO link / Modbus-RTU) communication supply modules. The **REX12D-TE** automatically recognises the corresponding operation mode and eliminates the need for additional versions for signalling and diagnostic functions as well as numerous current ratings.

One type for all current ratings

In COM mode, the device transmits measuring and analytic data as well as control options. It also makes it easy to adjust the current ratings via IO link or Modbus RTU. In standard mode, the current ratings can be manually adjusted with a push button. This means the user can very easily adjust the **REX12D-TE-...** electronic circuit protector to the required load conditions of the application.



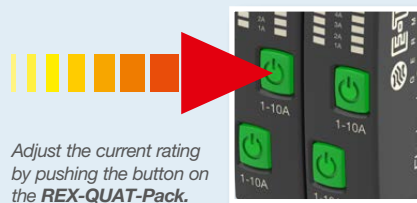
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In both modes, the adjusted current rating can be read directly on the unit – in COM mode also via IO Link and

Modbus RTU. E-T-A's **REX12D-TE** helps significantly reduce storage costs

Reduce part numbers with the Quat-Pack!

The four-channel **REX-Quat-Pack-1A-10** product combination, which is only 37.5 mm wide, combines an **EM12** supply module with two **REX12D-TE2** electronic circuit protectors into a single part number. This offers unrivalled flexibility and reduces inventory costs. The current rating of the devices can be manually adjusted with the push button on the device. The user can easily adjust the entire Quad-Pack to the load conditions of the DC 24 V application.



Adjust the current rating by pushing the button on the **REX-QUAT-Pack**.

Your benefits

One device for all applications and ratings

- **Increases machine uptime** through system transparency and remote diagnosis
- **Saves cost** since no additional accessories are required
- **Reduces wiring time by 50%** through innovative and flexible mounting and connection technology
- **Saves space** because the modules have a 12.5 mm footprint
- **Provides flexibility** through easy mounting or disassembly and a modular design
- **Reduces inventory costs** because one product is required for all current ratings

Technical data:

- Two channels
- Adjustable current ratings 1A-10 A (1 A increments)
- Voltage rating: DC 24 V
- Supports smart and standard mode
- Approvals: UL508listed
- Temperature: -25°C...+60°C
- Installation space: only 6.25 mm per channel
- Terminal design: push-in type including press release buttons
- Mounting: DIN rail
- **No further accessories required**



ESS31-TC electronic circuit breakers in packaging machines

The all-rounder

OPTIMA packaging group GmbH, a family-owned business, was founded in 1922. Its headquarters are located in Schwäbisch Hall in Germany. OPTIMA designs and manufactures individual machines, but also complex complete turnkey systems. Their customers include manufacturers of pharmaceutical products, consumer goods, nonwovens and Life Science products. Current talked to Gustav Marwitz, who works in OPTIMA's electrical design, about using E-T-A's electronic circuit breakers.

Current: You use E-T-A's ESS31-TC... electronic circuit breakers. Why did you select this product?

Gustav Marwitz: The ESS31-TC... is approved as a »Supplementary Protector« to UL1077 and UL Listed to UL60947/UL508 making it easy to use in »Field Wiring« according to UL508A »Industrial Control Panels«.

Current: Do you install these circuit breakers in all your machines?

Gustav Marwitz: Yes! A single circuit breaker version covers all the requirements for the European and North American market.

Current: What is your experience with the electronic circuit breaker?

Gustav Marwitz: Very positive! Circuit breakers offer selectivity and reliably detect faulty circuits. In addition, the

breakers provide an overview in the control cabinet which is second-to-none thanks to their integral power distribution of + 24 V and 0 V.

Current: Besides the standard current rating range 2 A, 4 A, 6 A and 10 A you recently introduced a new specific version rated to 3.6 A. This version is approved to UL1310, NEC Class 2.

Gustav Marwitz: These special circuit breakers protect sensors. These sensors can only be used in the North American market if they operate at a max. 100 VA limited Class 2 circuit.

Current: And the electronic circuit breakers meet these requirements?

Gustav Marwitz: Yes, they also meet the requirements

of UL1310 as a »Class 2 Power Unit« and can be used without any issues. It saves costs compared to expensive switch mode power supplies which carry this approval.

Current: Thank you for your time.



Electronic circuit breaker **ESS31-TC**
NEC Class2



OPTIMA packaging machine

PERSONNEL

»People are
at the very
centre of our
daily work«

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



Didier Coutry

Didier Coutry joined E-T-A in February 2018 as the General Manager of the French subsidiary and is responsible for E-T-A's sales activities in France. He has a Master of Science degree in Industrial Control Systems, his focus emphasises on automation, robotics and IT. He worked in factory automation field in France and Asia for many years and can bring a wealth of experience to E-T-A. His main task at E-T-A is to manage our local organisation in France and to push E-T-A's activities in the French market. This includes the sales approach for E-T-A products and systems and the related service for our local customers.



Jens Löffler

In May 2018, Jens Löffler took over the sales office in Hanover. He is the Regional Sales Manager and can advise our customers about questions concerning the E-T-A portfolio. Jens graduated as an electrical engineer from Hanover University. He worked as a software designer and also has professional experience as a technical sales engineer in machine construction and process control. It is Jens' goal to strengthen existing customer relationships and to acquire new customers for E-T-A.



Jan Petschler

Jan joined E-T-A in February 2018 to work in the South-West sales region. As a Regional Sales Manager, he is responsible for parts of Baden-Württemberg, Hesse and Rhineland-Palatinate. After graduating as a certified engineer of power electronics, Jan worked for an automation specialist for several years. He has comprehensive experience and practical knowledge in electrical design and automation solutions. His customers will benefit from custom protection solutions for their applications.



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FAQ

What does EX protection mean? ATEX vs. IECEx – approvals, standards, applications



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**

An explosion means that a large amount of energy is released in a very short time. The fast rise in temperature and volume and pressure is hazardous for people and destroys equipment and buildings. Protection against explosions, and its disastrous effects, is important for electric and electronic devices.

What is needed to cause an explosion?

For an explosion to occur, there must be a flammable gas as well as oxygen and an ignition source. As soon as a flammable element is sufficiently mixed with air, the atmosphere becomes explosive.

What are typical measures of explosion protection?

Explosion protection generally focuses on preventing explosive situations. This is mainly done through ventilation, monitoring and limiting gas concentration. Other measures include device-related protective actions such as separation of atmosphere and ignition source, limitation of ignition energy and prevention of explosion propagation.

How are hazardous zones classified?

We define three hazard zones for the EX protection: An explosive atmosphere exists **longer or permanently (zone 0)**, occurs **occasionally (zone 1)** or exists only for a **short period of time (zone 2)**.

What are typical ignition sources?

For electrical and electronic devices, the following ignition sources are possible:

- Hot surfaces (power loss)
- Arcs (switches, collectors, commutator rings)
- Static discharge with spark formation
- Compensating currents between different (grounding) potentials

What are the relevant standards?

EU directives¹ are the basis for harmonizing requirements for devices used in potentially explosive areas. These are summarised under the term **ATEX (ATmosphère EXplosible)** and are part of the CE conformity assessment process. **ATEX** is internationally acknowledged as proof. The normative basis is the IEC 60079 series

of standards (classification, housings, devices, etc.) and ISO/IEC 80079-34 (QM system). With IECEx, the IEC board offers its own procedure (scheme) for a harmonised explosion protection certificate outside the previously required harmonisation areas (EU/ATEX and North America/UL/CSA).

What are the major differences between ATEX and IECEx?

For ATEX Zone 2, conformity assessment and self-declaration is possible. The IECEx scheme, on the other hand, requires proof by an accredited EXTL², which creates an ExTR³. The laboratories are audited by an ExCB⁴. The reports can be found on the IECEx homepage (<http://iecex.iec.ch>).

Are there synergies between ATEX and IECEx?

As the normative basis is identical, the test results can be used in both areas. For this purpose, a suitable service provider must be commissioned who is accredited as a Notified Body in the ATEX and as EXCB in the IECEx area.

Where are ATEX and IECEx used?

The major application area for the ATEX directive is clearly in the EU countries. However, it is a globally known term and the corresponding marking is acknowledged in many places. There is a corresponding marking for UL/CSA for the North American region. The IECEx is mainly used in the Arabic (oil producing operations) and African (mining) markets.

What E-T-A product groups are approved to the ATEX directive?

Currently, E-T-A's BTS, BMS and ESX10 product groups carry the ATEX approval. Soon, the ESX10 will also receive an additional approval to IECEx specifications.

¹ 2014/34/EU (plant manufacturers) and 1999/92/EG (plant operators)

² ExTL = Ex Test Lab (e.g. PTB in Braunschweig)

³ ExTR = Ex Test Report

⁴ ExCB = Ex Certified Body



Johannes Dürchner
is a Design Engineer for applications
in automotive engineering at E-T-A

Requirement: Zero emissions - this offers many advantages for example in mining and reduces operating costs over time. Electrically powered mining cars are becoming more and more popular. Many requirements must be met by the power management. Harsh environmental conditions require elevated IP protection degrees. The power management solution should be easy to mount, including a plug-in cable harness. Limited installation space and different voltage levels (DC 24 V/Dc 800 V) require both a compact and sophisticated design that ensures safe handling of the voltages.

A solution approach out of the construction unit

Housing: A compact, weight-optimised enclosure available in IP65, IP67 or even IP69K, depending on the application. The housing also meets the requirement of no-tool opening and ease of mounting.

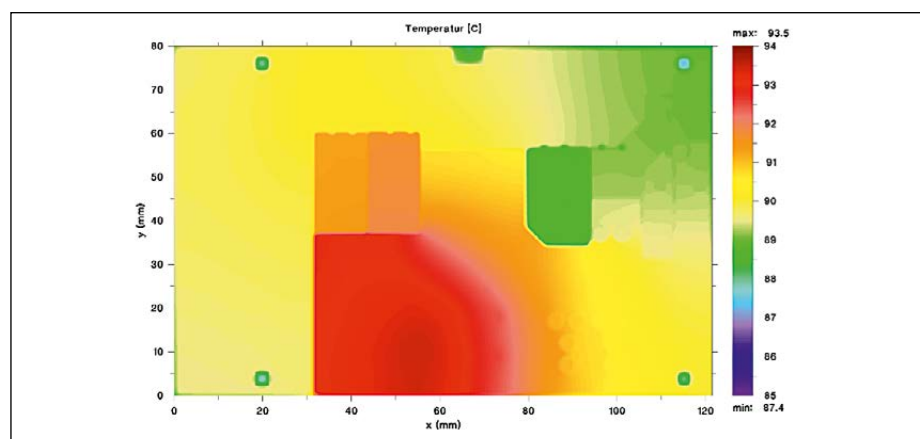
Printed circuit board: Standardised sub-assemblies are used here. We can also design a customised printed circuit board that is temperature- and cost-optimised from the start through the use of simulation technology. Hot spots on the pcb can be detected at an early stage and eliminated by adjusting the layout or the layer set-up. At the same time, it is possible to determine the sufficient number and thickness of layers.

Protective element: Pluggable design and fine grading of current ratings of the circuit breakers ensure a reliable and precise disconnection in the application. For higher current ratings, we include our high performance circuit breakers.

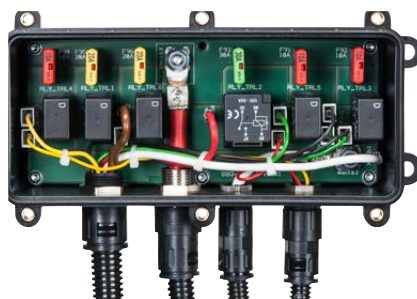
Solutions from the construction unit for electrically powered construction machines

Compact and powerful

Many requirements must be met for power management.



Top layer of a DC power distribution. The visible hot spot is in the area of the power input.



Combination of different protection and switching elements in a compact design and high IP rating



Application-specific cable harness in a corrugated conduit

They are connected directly to the power distribution system via busbars.

Relays: The circuit breakers can be combined with a range of switching elements, depending on the requirement. This might include electronic relays for high switching frequencies and low power loss as well as electro-mechanical relays and special relays.

Wiring of loads: We use pre-mounted cable glands, integral connectors in the enclosure or complete cable harnesses that are tailor-made for the application.

Modularity: The modular design of the individual components in the circuitry allows us to meet individual customer requirements. We can include different voltage levels in a single power distribution system. High voltages such as DC 800 V can be combined with DC 24 V levels.

Design process: Our flexible and clearly defined design process, and our close proximity to the customer, allows us to easily respond to customer requirements.

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 types: PDM, 18plus and ESS30

With tested safety to series production

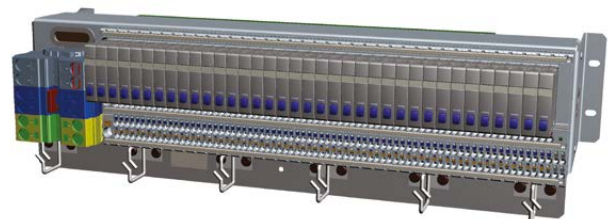
The **Bayer AG Division Crop Science** in Dormagen designs and produces various plant protectants. In a flexible multi-purpose plant they test all individual production steps “on a small scale” and then start initial production.

The interconnection of individual system parts, which is necessary for the process, is easily accomplished in this modular test system. Of course, a flexible power supply is required. For this purpose, Bayer uses power distribution systems for the DC 24 V supply and for protecting the load circuits with ultramodern technology. It is the only way to reliably protect and monitor new production processes. The various load circuits are protected with **ESS30** plug-in electronic circuit

breakers and a 36 slot **PDM power distribution system**. Large terminals allow the redundant power supply up to 80 A. Internal de-coupling diodes interconnect the voltages on the joint plus side of the **18plus terminal block**. These are mounted on an aluminium rack. It also holds all other components for distributing and monitoring the loads. It creates a clearly laid-out unit which is easy to connect. The user can fully concentrate on the process evaluation.



Module 18plus power distribution system



E-T-A type: PDM with ESS30



E-T-A type used: Circuit Breaker/Switch Combination 3120-F3

■ Success is a question of adjustment

E. Zoller & Co. KG is a family owned company that manufactures and sells taps and meters as well as software for measurement, inspection and administration of cutting tools. They started 1945 on a small scale as a mechanical workshop. Overtime, they have grown into a globally active technology and system solutions supplier.

An excellent entrepreneurial spirit and continuous innovations make Zoller an international market leader. E-T-A's **3120** circuit breaker/switch combination works as an ON/OFF switch in its taps and meters. The **3120** also reliably protects the instruments in the event of overcurrents.

Devices and solutions made by Zoller are vital in many production processes. They guarantee the best possible use of tools and optimal process efficiency. Their tasks cover tool adjustment, inspection as well as storage and

administration. The advantage: Thanks to many years of experience, each customer receives the ideal combination of hardware, software and service. In order to reduce mounting and wiring time when producing taps and meters, E. Zoller decided to use E-T-A's **3120** circuit breaker/switch combination. Thanks to its dual function – ON/OFF switch and overcurrent protection in a single device – it helps significantly reduce the number of components required. Optional push-in terminals also offer easy and quick wiring and ensure long-term conductor contacting.



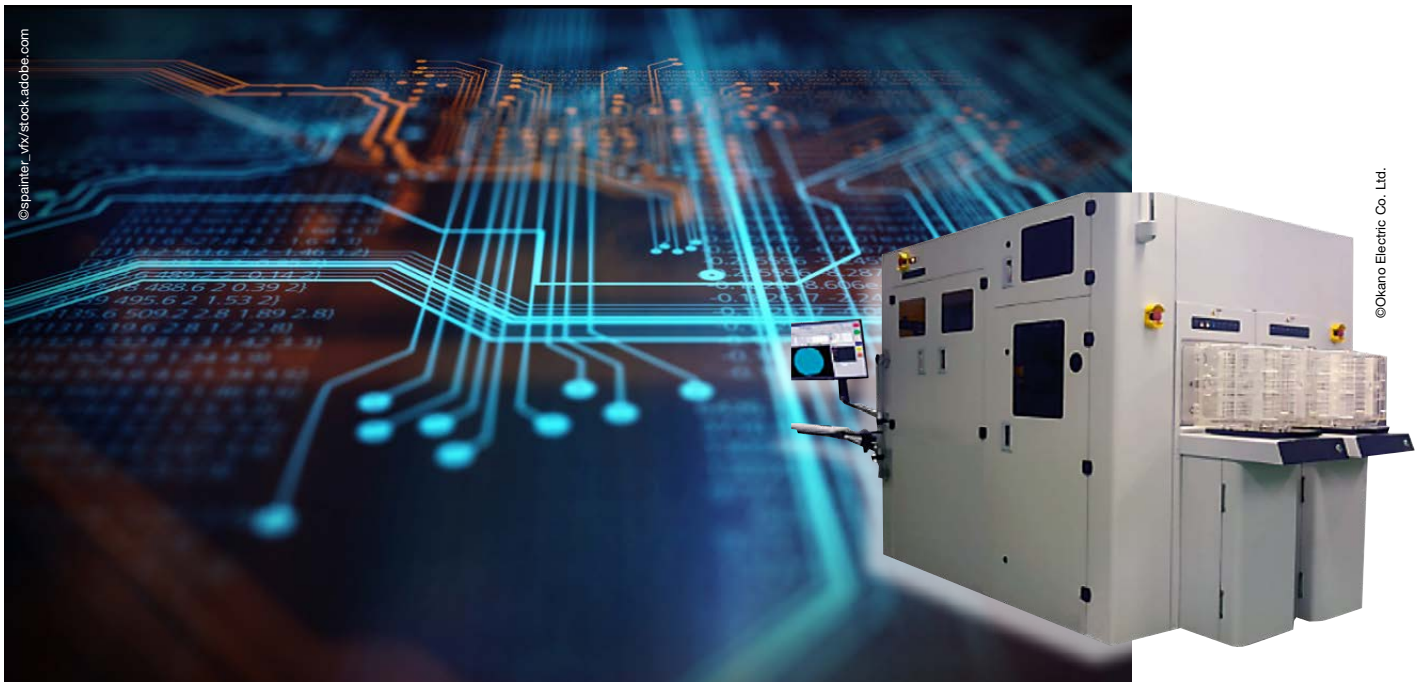
E-T-A type used: Circuit Breaker/Switch Combination 3120-F3



The **REX12-T** electronic circuit protector protects DC loads in measuring and test equipment

Superior visual inspection

Okano Electric Co. Ltd. is a Japanese mid-size company founded in 1969. They specialise in producing optical and electrical measurement and inspection machines.



E-T-A's REX12-T enhances machine uptime at Okano Electric.

One of the core competencies of Okano Electric is the customisation of their machines to the exact requirements of their customers. The high-performance inspection machines, using high-speed and high resolution cameras for detecting the critical wafer defects, are well known for their outstanding quality and long-lasting reliability.

High performance test equipment

The electrical DC circuits of these machines are usually protected with conventional protection devices. In its latest models, Okano Electric is using E-T-A's **REX12-T** electronic circuit protectors to protect sensitive DC loads such as sensors and solenoids.

The key benefits of the **REX12-T** are the reduction of space as well as wiring efforts, as the **REX12-T** devices are connected

and mounted side by side according to the requirements of the application and do not require additional accessories. The LEDs on each device shows the status of each channel for the respective load.

Enhanced machine uptime

Okano Electric appreciates the enhanced accuracy of electronic circuit protection compared to conventional systems. It significantly increases the availability of their inspection machines by reducing the downtimes.

Overall Okano was able to improve the protection of their machines while reducing system costs and increasing machine uptime. E-T-A is proud to be a supplier to Okano Electric and we are eager to support our customer's future demands with additional E-T-A overcurrent protection solutions. We wish to continue our local

cooperation with Okano Electric in Japan and we hope the success story for both Okano and E-T-A will further improve the respective brand awareness.



REX12-T electronic circuit protector

CULINARY DELIGHTS

Typically Japanese:

»Katsudon – pork cutlet on rice«

This Japanese recipe has some German ingredients, because Katsudon is a combination of Tonkatsu (breaded pork cutlet) and Donburi (a dish placed over rice). It is a very popular kind of casual rice dish, often eaten before exams in Japan, because the verb “katsu” means as much as “to win”.

Directions

Put rice in a pot and wash with cold water. Rinse rice four to five times until the water is clear. Finally add 250 ml cold water so that the rice is slightly covered. Heat on a high flame and allow to boil once until the rice foams, then switch off heat at once and put on the lid. Leave the rice for 20 minutes without lifting the lid.

Meanwhile rinse the cutlets and dry with paper towel. Beat one egg on a plate, season with salt and pepper. Put panko in a second plate. Pull cutlets through the egg and then turn them over in the panko. The cutlets should be well covered in panko. Fry the cutlets in a pan with plenty of hot oil, one after the other, and drain on a plate with paper towel. Cut into bite-sized pieces and keep warm in the oven at 80 - 100°C.

Cut green onions into rings. Put dashi, mirin, soy sauce and sake into a wide pan and bring to boil at medium flame. Add the cutlet pieces.

Beat the second egg and add to the pan after 2 minutes, reduce heat to low flame. Finally, sprinkle with green onion rings and allow to boil for another 2 minutes. The egg should now have set and the cutlets should have well absorbed the sauce on the lower side.

Carefully turnover the rice in the pot with a wet wooden spoon and put one half each on a plate. Serve the cutlet with the egg-sauce placed over the rice and serve while hot.

Preparation time: 60 minutes

Ingredients (2 servings)

- 200 g sushi rice or round grain rice
- 250 ml water
- 4 pork cutlets
- 50 g panko (or breadcrumbs)
- 2 eggs
- 2 green onions
- 3 tbsps soy sauce
- 2 tbsps Mirin (rice wine condiment)
- 2 tbsps Sake
- 200 ml Dashi (or vegetable stock)
- salt and pepper, oil for frying



*Typically Japanese:
»Katsudon«*





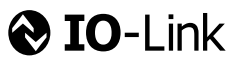
Photo: © KraussMaffei


REX12 – the select compliance with the machinery directive



The REX system – Your all-in-one solution

Consisting of three components – **supply, overcurrent protection and power distribution** – the **REX12 system** revolutionises the DC 24 V level.

- **Increases machine uptime** – through clear failure detection, high transparency and remote diagnosis
- **Provides flexibility** through ease of assembly or disassembly, modular design and convenient adjustment
- **Saves 50 % time** – through innovative and flexible connection technology
- **Saves cost** – no further accessories required
- **Saves space** – because each module is only 12.5 mm wide






 Line protection to EN 60204-1

NEC Class2 to UL1310

Talk to us! We look forward to consulting you.
www.e-t-a.de/cude3-18



E-T-A®

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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