



## Best connections – the REX family

REX12 electronic circuit protector for protection and distribution of DC 24 V

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... says the Swiss St Gallen University.

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**Modern relays – the next generation**  
Solid state relays and mechanical power relays

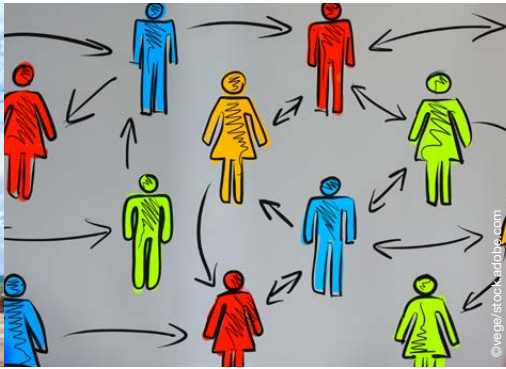
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### Impressum

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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  
Communications Department

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# E-T-A is World Market Leader...

... says the Swiss St Gallen University.

**E-T-A manufactures circuit breakers and circuit protectors. For almost seven decades, we have protected lives and values and we know that no one in the world is as committed to this subject as we are. No other manufacturer produces a broader product range nor a similar range of variants. And this makes us very proud.**

We are very pleased that E-T-A's market leadership has been acknowledged by an independent authority: Under the scientific direction of Professor Christoph Mueller, the Henri B. Meyer Business School of the St. Gallen University developed the World Market Leader Index in co-operation with the ADWM. Supported by their media partner Wirtschaftswoche, the selection committee guarantees a neutral and transparent selection process, with selection criteria and assessment scores freely accessible. It includes criteria such as market share in the relevant world market, global activities, export share, headquarters and annual turnover. So, E-T-A is officially certified as a World Market Leader in our industry.

Professor Dr. Christoph Müller from the HBM Business School of the St. Gallen University, considers world market leaders as globally active and successful companies, mostly with leading technology and family ownership.

This is impartial proof of E-T-A's world market leadership. It makes us very proud and motivates our entire team, all over the world, to continue working on our role and maintain our reputation.

Are you planning to design a new product and do not want to risk any overcurrent protection problems? Together we will find the perfect protection solution.

**We look forward to hearing from you!**



*Dr. Clifford Sell*

*Executive Committee*

*E-T-A Elektrotechnische Apparate GmbH*





*Solid state relays and mechanical power relays*

## Modern relays – the next generation

The new solid state and electro-mechanical relays offer a wide range of functionalities and allow easy configuration online.

**1835 Joseph Henry invented the electro-mechanical relay. The physical unit Henry [H] is actually named after him. Ever since this time, the relay has continuously been improved, miniaturised and today can be found in nearly every technical application. For the added benefit of timer or flasher functions, analogue components were added to the electro-mechanical relays. This was generally considered the third generation of relays.**

### The next relay generation

On-board electrical systems in modern trucks, buses and construction machinery are getting more and more complex and sophisticated. Relays are expected to offer more and more functionality. E-T-A's latest relay adds a

micro-controller and software functionality to its capabilities. These relays are small control units, allowing the user to select various attributes, to configure and combine them. The relay can be programmed to meet the needs of the application and will support the design engineer in his work.

### Typical functions

- ON delay, OFF delay
- Level control
- Pulse control
- Voltage monitoring
- Automatic load-shedding and pick-up etc.

### Ease of configuration

A wide range of functionalities is not only offered by our solid state relays

(**EXR10, ETR10**), but also by the powerful mechanical contact system (**HPR10**). You can set up your selected hardware and functions, parameters and combinations as desired with E-T-A's online configurator. At the end, you can request a quotation with one mouse-click only.

E-T-A's **HPR10**, for example, can ensure that your local bus starts reliably every day because it permanently monitors the battery voltage condition - independently of the control gear. As soon as the battery voltage falls below a certain specified value, the HPR will disconnect the power consuming loads. As soon as a sufficient battery voltage is restored, the load will be picked up again automatically. This is quite an easy way to increase vehicle uptime.



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## Your benefits

i

### Solid state relays

- Reduction of downtimes due to no moving parts and more than 1 million switching cycles
- Less fuel consumption and CO<sub>2</sub> emission through energy-saving relays
- Enhanced flexibility because the relays are easily customized to the application based on their numerous functionalities.

### Electro-mechanical power relays

- Freedom of planning due to compact design and high rupture capacity (300A)
- Additional system capability through very high ampacity peaks of the power relays
- Less fuel consumption and CO<sub>2</sub> emission, because the bistable power relays to not use any holding current in the ON condition
- Less design efforts with the control gear through smart relay functionalities such as voltage monitoring and ON or OFF delay

In buses, the **ETR10** ensures that the door steps are illuminated for a certain length of time even though the driver may already have removed the ignition key when taking a break. This improves the driver's safety when he's leaving the bus in the depot at night.



ETR10 and EXR10 solid state relays



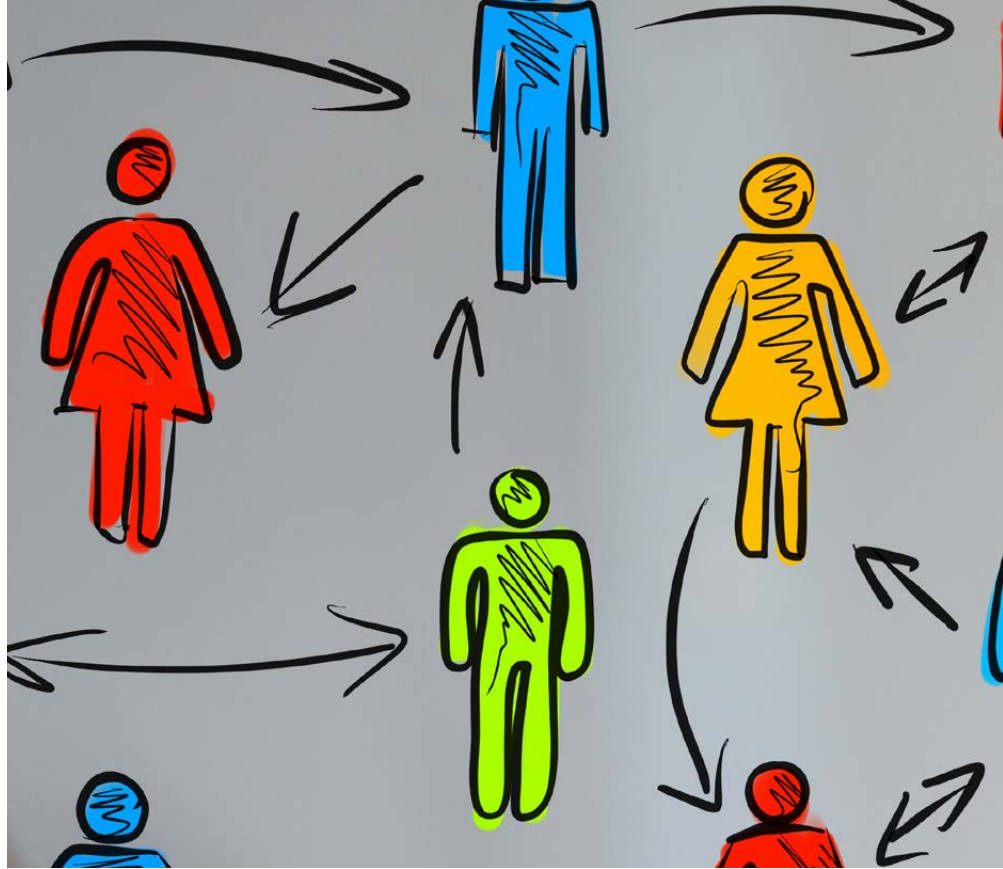
HPR10 power relay



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©Petrar/Fotolia.com



**REX12** electronic circuit protector for protection and distribution of DC 24 V

## Best connections – the REX family

Electronic circuit protectors have long been the first choice when it comes to reliably protecting primary pulsed switch mode power supplies in machine and panel building.

The advantages are obvious: The overcurrent protection, designed specifically for these applications, responds exactly to the requirements of the power supplies. The focus is on the stable operation of switch mode power supplies, on easy trouble-shooting and unimpaired machine uptime. Besides the standard protection against the effects of overcurrent and the communicative connection to the **IO link**, the **REX12** portfolio now also offers a sophisticated distribution and supply concept for the entire DC 24 V protection system.

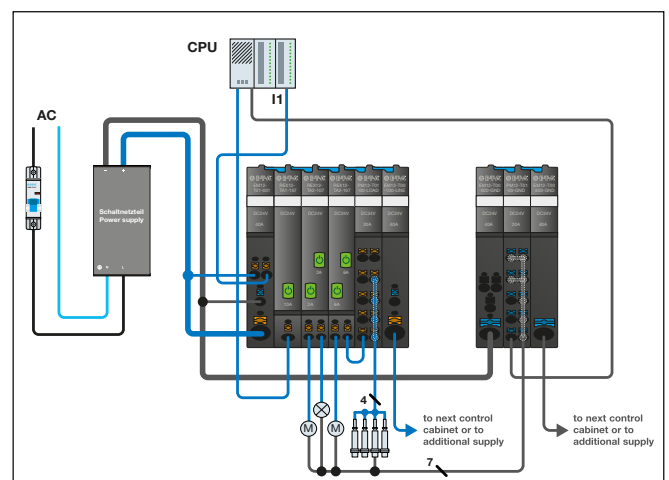
E-T-A's electronic overcurrent protection combines flexibility with compact design. It exactly meets the technical requirements and economic expectations of the machine construction industry. No accessories are required for the electrical and mechanical connection of the individual components. This helps save time and money!

The REX product family is a suite of perfectly matched modules. It includes the **EM12-T** supply module for the plus and minus potential via a single or double channel **REX12-T** electronic circuit protector which can be mounted side by side in any number and the newly designed **PM12-T** potential extension module for plus and minus multiplication.

The 12.5 mm wide modules feature push-in technology for wiring with press release buttons and allow no-tool, time-saving, maintenance-free wiring. All supply modules are designed for DC 24 V and 40 A. They accommodate cables with a cross

section of 10mm<sup>2</sup> with wire end ferrule and plastic collar. The load outputs of the circuit protector and the extension modules are wired up with 2.5 mm<sup>2</sup>.

The innovative REX connector arm on each individual device accomplishes the otherwise complex and cost-intensive







connections of supply and signalling. The devices are placed side-by-side on a symmetrical rail and are electrically connected without further accessories. A new addition to the **REX12** product range is the convenient, modular and sophisticated supply and distribution concept. It makes the entire DC 24 V supply still more compact and organised. Trouble-shooting will be even faster and machine uptime will increase.

#### How does the new distribution concept work?

The new **PM12-T** distribution modules for the +DC24V distribution are mounted alongside and electrically connected with the **REX12-T**. This increases the number of terminals - providing up to nine outputs. It saves space and replaces conventional distribution terminals.

#### Also for the DC 0 V (GND) return conductor

The 0V potential is connected to the **EM12-T** supply module for GND and multiplied for DC 0 V (GND) with the **PM12-T** module. These components can also conveniently be connected and wired up. The distribution solution for DC 0 V is suitable for 40 A rated load. Rating of components is made easy for the design engineers. Complex design solutions to reduce cable cross sections from 10 mm<sup>2</sup> to 2.5 mm<sup>2</sup> are a thing of the past. The user enjoys unrivalled flexibility of the new distribution and supply concept for DC 24 V applications - it makes planning easier and saves space, time and costs.

## Your benefits

- Compact size saves installation space
- Saves time through ease of wiring
- A perfectly matched system saves costs and additional accessories



The **REX12** family system combines overcurrent protection with power distribution directly on the symmetrical rail.



**Thomas Steiner,**  
responsible for control cabinet  
design at WEIMA Maschinenbau  
GmbH

WEIMA relies on E-T-A's **ESX10-T** electronic overcurrent protection

## ■ A safe way of shredding and briquetting

Since the foundation of the company in 1986, **WEIMA Maschinenbau GmbH's** core business focuses on the shredding and briquetting processes. They build the squeezing machines for these processes and sell them worldwide, ensuring high quality and profitability. The Current talked to Thomas Steiner, responsible for control cabinet design at WEIMA, about the use of E-T-A's **ESX10-T** electronic circuit protector.

**Current:** How did you find out about E-T-A?

**Thomas Steiner:** Since we sell our machines all over the world, we adjusted the control voltage to switch mode wide range power supplies. We learned very quickly that DC24V protection cannot satisfactorily be accomplished with conventional blade fuses. We came across E-T-A at a trade show. The following meetings and presentations convinced us and we decided to use the ESX10-T.

**Current:** Why did you choose E-T-A's electronic overcurrent protection?

**Thomas Steiner:** We had a number of reasons. On the one hand, it was the small width of the device. Our customers greatly appreciate the compact size of our control

cabinets. In addition, we like the selective protection, providing ease of troubleshooting, and the clear indication of operating conditions. As our machines are used worldwide, we also value the UL and CSA approvals.

**Current:** What is the daily benefit of these features in the field?

**Thomas Steiner:** Beside the compact size, we truly appreciate the ease of system extension in the field with busbars and jumpers. What really counts in the end, however, is the unrivalled machine uptime we can ensure with the help of E-T-A's products.

**Current:** What is your experience with the ESX10-T?

**Thomas Steiner:** E-T-A's products convinced us especially in the demanding everyday service. They excellently fulfil their function.

**Current:** Thank you for your time.



WEIMA's WLK Jumbo EuroEco



# P E R S O N N E L

**"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.*



## **Jakob Federl**

Jakob Federl joined the Global Sales Center as a Technical Services Manager in January 2017. He started in 2007 as a trainee at E-T-A and after his training as an electronics technician for instruments and systems he continued to develop his knowledge to become an industrial specialist for electrical engineering and certified technical business management specialist. It is Jakob's goal to provide E-T-A customers and partners with the best possible support regarding the use of E-T-A products and solutions.



## **Werner Rümpelein**

Werner Rümpelein has supported E-T-A's European sales organisation as a Market Manager, Communications since May 2017. He is responsible for the sales and product strategy in Europe for the telecommunication and data centre industry and services major key customers. Werner joined E-T-A in 2008 and he intends to work with his customers on innovative E-T-A solutions for their applications.



## **Hisaya Kitahara**

In October 2016 Hisaya Kitahara joined E-T-A Japan to develop the automation market and identify new business opportunities. He studied in the United States and has a wealth of experience from working in sales and business field management in the automation industry in Japan and abroad. His capabilities and personal qualifications will certainly help him advise our customers from the technical point of view as well as benefitting from the international co-operation with these colleagues worldwide.



# FAQ

General protection of on-board electrical systems in cars / selectivity

## “The technological evolution of protection for on-board electrical systems in cars (part 2)”



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](mailto:faq@e-t-a.de)

### What is a radial system?

Radial systems have the supply only on one side, i.e. the lines go radially to the loads. This makes them easy to monitor and calculate. In the event of an interruption at the point of supply of a load, all downstream loads will be disconnected as well.

### What is a backbone architecture?

With a backbone architecture (fig. 1), the plus potentials for each voltage existing in the network, e.g. 12 V and 48 V, and an extra ground wire are led lengthwise through the vehicle. This eliminates complexity and possible EMC problems and shortens the load lines.

### What is a loop network?

Loop networks (fig. 2) are fed from two sides. Thus the current distributes to both sides. In the event of a disruption, parts of the loop line are removed. The remainder of the load spots will work again like a radial system. This network type provides a higher supply security.

### How does the trip characteristic of a blade fuse change with age compared to a circuit breaker?

Fuses age due to the diffusion of two metals at the interfaces between each other (soldering pill of tin or coatings). This will change the trip characteristics, above all in the highly dynamic peak loads in automotive applications. The best possible protection is only ensured when the fuse is completely new. A thermal circuit breaker

will ensure unchanged protection over the entire life span.

### What is selectivity in a car's on-board electrical system?

Selectivity in an electrical radial system essentially means that the protective element only disconnects the affected branch in the event of a failure - i.e. the branch closest to the load. This is the only way to ensure the highest security of supply for all connected loads. Loop networks and backbone architectures achieve a high security of supply by way of the network topology.

### What are the advantages of a thermal circuit breaker compared to a blade fuse?

Unlike fuses thermal circuit breakers, with a bimetal trip element, do not age and keep their trip characteristics. In addition, circuit breakers do not have to be replaced in the event of a failure, but will automatically (J-type) or manually (M-type, S-type) be reset after the failure is resolved. The trip curve of a thermal circuit breaker runs largely in parallel to the temperature rise curves of the cables and can be rated in a way to ensure optimal protection over the entire current range. In many cases, this also helps reduce the cable cross sections.

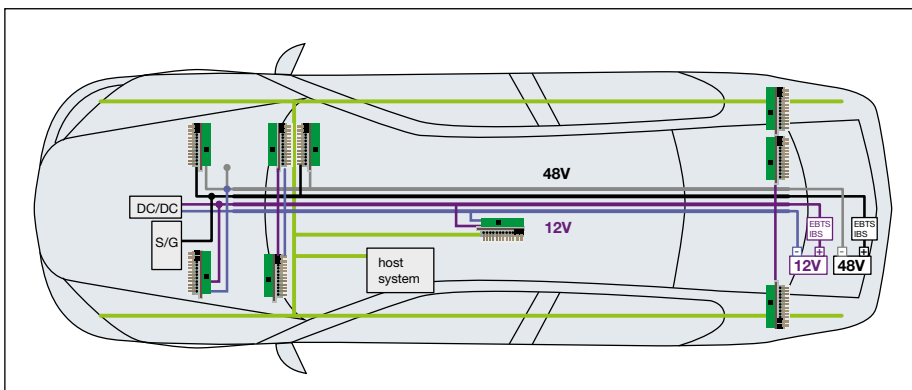


fig. 1: backbone architecture

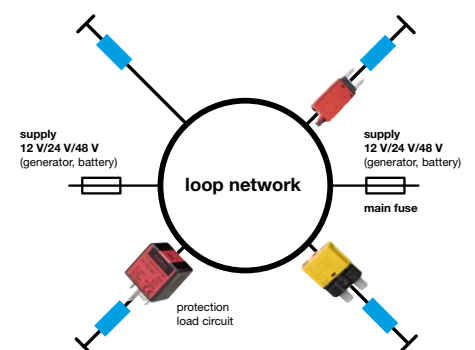


fig. 2: loop network





**Michael Bindner, M.A.**  
Product Manager  
Communication & Systems Division

Telecommunication technology is the basis of the rapidly growing interconnectedness and digitisation in the age of industry 4.0. In server cabinets of data centres or in communications systems of power plants, the permanent availability of the systems, their protection against destruction and the transparent integration into the centralised control systems requires far more than pure overcurrent protection.

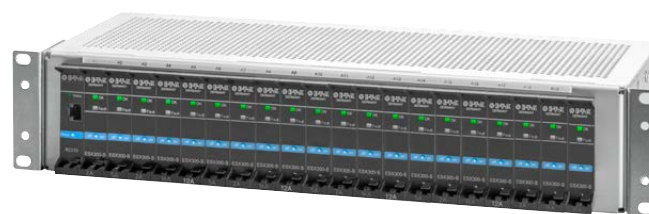
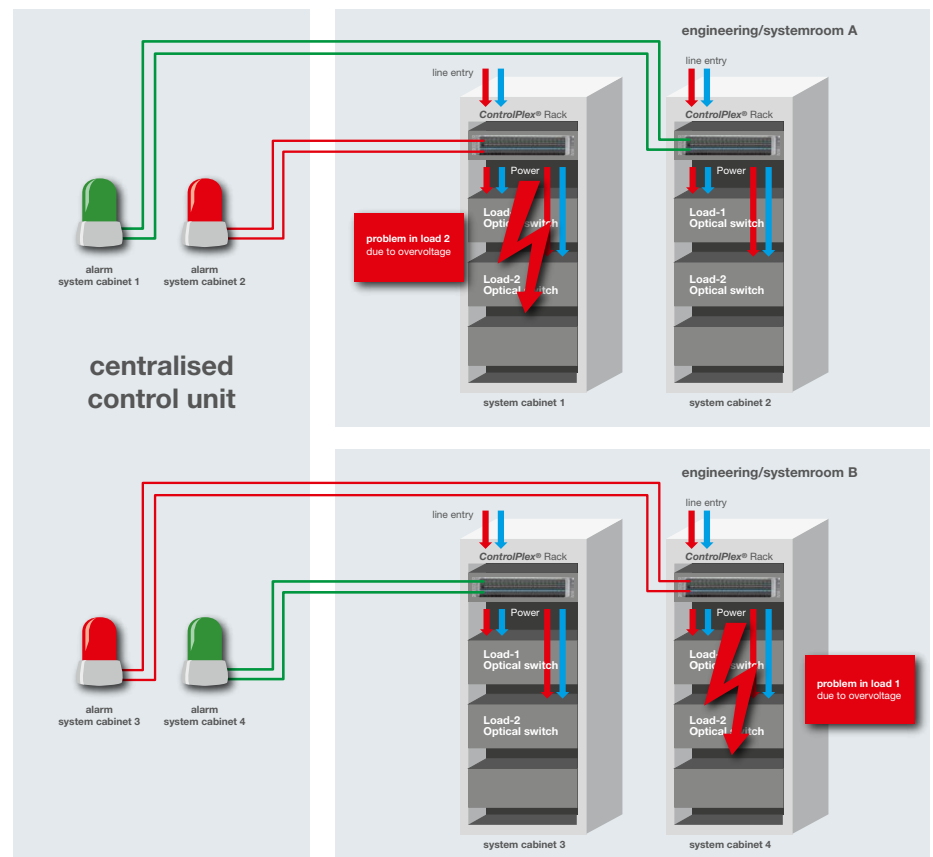
E-T-A's **ControlPlex® Rack** is the perfect solution for the requirements of this industry. It combines power distribution and overcurrent protection with smart control and monitoring technology. Therefore this compact 19" system ensures unrivalled availability of the plants.

One of the core components of the system is the **ESX300-S** electronic circuit protector. It reliably prevents the destruction of electronic sub-assemblies or load lines through current limitation and load disconnection and overcurrent protection. Thanks to selective disconnection of the loads, a voltage dip is prevented in the event of a failure. Other faultless devices in the circuit continue to operate. The **RSI10** Remote Signalling Interface communicates with all circuit protectors installed in the **ControlPlex® Rack** via an internal bus. Should one of the protectors disconnect the related load due to an overcurrent or similar, the RSI10 will indicate this status via a potential-free group signal externally, i.e. to a control room. This allows transparent integration of the operating condition of the plant into the centralised monitoring system and in the event of a failure, it ensures

Smart power management and plant protection for communication technology

## Intelligent distribution

The new **RSI10 signalling module** allows reliable and early detection of system malfunctions.



E-T-A continuously extends the **ControlPlex® Rack** portfolio and pursues the strategy of intelligent system technology to offer solutions for communication technology which are fit for the future.

reliable and early detection of malfunctions. It is the perfect way to minimise downtimes and reduce operational and maintenance costs. If a sub-assembly has to be replaced, it can be done with the system live (plug and play) to avoid costly system downtimes.



The **RSI10** receives the group signal of the **ESX300-S** via the integral bus and forwards it to the centralised control room.

*E-T-A type used: PDM and 2210*

## E-T-A solutions for many products

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

*Here are some interesting examples.*

## Secure our daily bread

For a growing world population, it is a challenge to produce sufficient food, animal feed and renewable primary products when agricultural crop land is limited. This is one of the goals of **Bayer-Division Crop Science**. They are active in the field of plant protection, seeds and also applications beyond agriculture.

When they extended their production plant in the chemical park in Dormagen, they started using E-T-A's new power distribution systems fitted with **module 18plus** as a standard. The individual **modules 18plus** are already firmly mounted and wired on the **basic PDM rack**. The user does not have to compile, order and mount individual components. The pre-assembled distribution rack is mounted in the control cabinet with four screws and only has to be connected to

line entries and loads. Two different versions create a 24-way power distribution system with redundant supply and de-coupling diodes as well as redundant 3 x 3-way pre-distribution. The easy layout also saves the otherwise standard separate minus and ground wirings and optimises cable arrangement. Integral auxiliary contacts allow quick and easy integration in monitoring systems.



*E-T-A type used: PDM and 2210 circuit breaker*





*E-T-A type used: 1170*

## ■ Secure the crops

**PÖTTINGER** is an Austrian family-owned company run by the owners and is located in Grieskirchen/Upper Austria. Pöttinger is an agricultural company, specialising in grassland technology, tillage machinery and seeding.

They have more than 1700 employees worldwide and are a global player with high quality products in all major markets. The company's growing success recently brought a strong internationalisation in its wake: An export rate of more than 85% proves the importance of the global markets for Pöttinger.

Their pneumatic seed drill machine AEROSEM features an electrical dosing appliance which feeds the seeds by means of a DGPS controlled speed signal into

the airstream. Pöttinger specified **E-T-A's 1170** thermal circuit breaker to protect this equipment. The automotive circuit breaker features reliable trip behaviour, snap-action mechanism, trip-free mechanism and a high rupture capacity.

Additional benefits include: ease of resettability as well as suitability for harsh environmental conditions because of its resistance to shock, vibration and temperature changes.



*E-T-A type: 1170*



*REX12-T electronic circuit protector ensures packaging safety.*

## Liquid and beverage packaging in China

Jiangsu Newamstar Packaging Machinery Co. Ltd. is one of the largest suppliers of liquid and beverage packaging machinery in China.



*Three working phases in one: high speed combiblock at Newamstar*

Major business segments for Newamstar solutions are bottling of beverage, dairy products, alcohol, condiments and household and personal care. Their portfolio covers the entire range of intelligent equipment. It includes water treatment, pre-treatment, blow moulding, filling, secondary packaging, robot transfer as well as intelligent stereoscopic warehouse. In addition, Newamstar offers additional comprehensive services such as: covering formulation process support and customer factory layout engineering (early design stage) as well as training and service support (after sales).

Our **REX12-T** provides precise overcurrent protection for their machinery. They appreciate the flexibility of the **REX12-T**. It can easily be combined and extended

with single and dual channel products to exactly meet the number of loads to be protected. The **REX12-T**'s compact size and the unique connection technology, without additional accessories, reduce the complexity for procurement, assembly and maintenance.

Thanks to the benefits of the **REX12** portfolio, Newamstar selected the **REX12-T** for the overcurrent protection of their DC 24 V high speed combiblock. This machine combines the blowing, filling and capping system into one integrated process, reducing several intermediary steps including: transmission, empty bottle handling and storage processes. It optimises the hygienic condition of the process and reduces packaging cross-contamination. In addition, it improves

the overall operating efficiency with lower energy consumption, which in turn reduces the overall cost of production.

On their website and in their facility, Newamstar pursues the idea that "innovation drives the development and quality gains the market". **With this, Newamstar aims to achieve the dream of "Chinese equipment, world equipment" – with E-T-A inside!**

*REX12-T electronic circuit protector*



# CULINARY DELIGHTS

*Typical Chinese:*

## Spicy Chinese food – care for some wontons?

*Wontons (Chinese dumplings) are part of the typically Chinese Sichuan cuisine. They can be steamed, fried or boiled in broth. Most often they are filled with minced pork, but you can also use seafood or a mixture, as in the recipe.*

### Directions

Cut shrimp and Chinese cabbage finely and thoroughly knead with minced meat. Add marinade while kneading. If the mixture is too dry, add a little water. It is important that the meat dough has the right consistency before it goes into the wrappers. Finally, add green onions and garlic and rest for 20 – 30 minutes. Before filling into the wrappers, add the egg so the meat connects with the wonton wrappers.

Now comes the tricky part: Put one wonton skin on your hand, put about one teaspoon of the filling in the centre. Fold the edges of the wrapper or press them together by twisting them (tutorials available on YouTube!).

Continue until all wrappers are used. They can now be prepared as a soup (e.g. in chicken stock) or steamed over water in a bamboo basket. In both cases, it takes about 5 – 10 minutes until they are done.

### Ingredients for the dough:

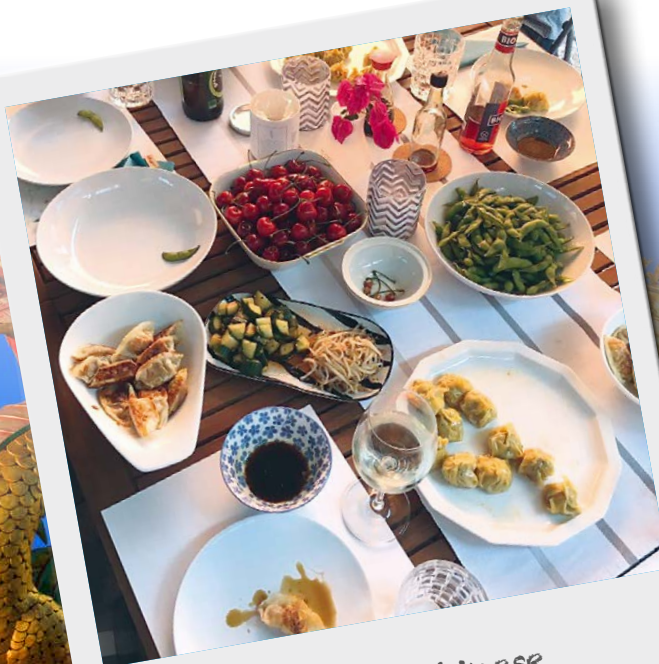
- 300 g minced meat (pork)
- 100 g shrimp, peeled, raw
- 6 green onions (cut into rings)
- 2 garlic cloves, finely chopped
- 1 whisked egg
- 6 - 8 leaves of Chinese cabbage (finely cut)
- 60 Wonton wrappers

### For the marinade:

- 2 tbsp dark soy sauce
- 1 tbsp rice wine
- 1 tsp sesame oil
- some water if required

### How to serve:

Either in a broth or with soy sauce, sesame oil or other (spicy) sauces.



Typical Chinese



# Thermal circuit breaker/switch combinations

## Two in one:



Protecting and switching within one device!  
E-T-A offers a range of thermal overcurrent circuit breakers plus ON/OFF functionality.

- **Reduced inventory and storage costs:**  
Replaces switches, fuseblocks and inserts for blade fuses
- **Tremendous time savings:**  
Never change a fuse again - just reset it!
- **Reduced mounting and wiring time:**  
Only a single component! Load terminals with push-in technology!
- **Space-saving design:**  
Integral overcurrent protection even with installation in limited space
- **Enhanced overall reliability:**  
Less single components mean less error sources.

Talk to us! We look forward to consulting you.  
[www.e-t-a.de/cu\\_e3-17](http://www.e-t-a.de/cu_e3-17)



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