

# The perfect choice for everybody

REX12 circuit protector for DC 24 V



**Precise.  
Sophisticated.  
Reliable.**  
Exact protection

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**Reliable double pole switching**  
3120 circuit breaker/switch combination

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**In a class of its own**  
ESR10 Micro solid state relay

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**A showroom on wheels**  
E-T-A **PowerPlex**<sup>®</sup> touring Australia

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3120 circuit breaker/switch combination



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E-T-A REX12 circuit protector for DC 24 V offers the best possible price-performance-ratio in automation



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»Australian Porridge«

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### Impressum

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# ■ Precise. Sophisticated. Reliable.

## Why protection needs to be accurately matched.

You are working to build and support your strong brand. You are manufacturing products that meet the needs of your target markets' requirements. Your customers rely on your products and you are committed to them. As a matter of course, you precisely plan all functions, applications and possibilities of use. This is greatly appreciated by your customers.

Very certainly, you are well aware of the importance of protection. It is all the more important to accurately match the protective elements with your product. This is the only way to ensure precise trip behaviour - whenever required, but never too early. If tolerances, for instance, are too large, this may cause so-called nuisance tripping. Users get easily frustrated about such things, and unnecessary complaints are raised. This may seriously affect your reputation as a manufacturer. If the protective element trips too late, this can cause serious problems. But with a perfectly specified E-T-A product, you are always on the safe side.

A dialogue with a customer is critical for providing perfect protection. No other manufacturer in the world can offer you as many models and versions as E-T-A. We take tailor-made protection seriously and are happy to assist you. Based on your requirements and frame conditions we will find the best possible protection for your product - without any compromises. Your customer will enjoy the benefits of your products, your brand will be strengthened, product rejects will be avoided and your market position will be improved.

Are you planning to design a new product and you do not want to risk any overcurrent protection problems? Talk to us! 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*



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

3120 circuit breaker/switch combination

## Reliable double pole switching

The industrial injuries corporation ETEM recorded approximately 700 accidents caused by electrical current in 2015. Seven of them were fatal. E-T-A's double pole circuit breaker/switch combination reliably interrupts the phase conductor during the switch-off operation in professional apparatus and machinery – reducing the risk of electric shock. Even experts are surprised by the reason.

Typically, for safety reasons, professional tools and machines with power plugs for use in single-phase AC networks are fitted with double pole circuit breakers for equipment protection. Only double pole ON/OFF-switches are able to ensure reliable disconnection of the live phase wire when switched off.

Blade fuses and circuit breakers can also switch off devices. But the same is also true for them: Only the double pole versions are able to interrupt the phase conductor without any questions. Very few design engineers know that the single pole mains switches and single pole overcurrent protectors only have a 50 percent chance to actually switch off the phase conductor when disconnecting.

It is simply a matter of chance on which conductor the phase lies and it depends on how the plug was plugged into the socket. Everybody knows that a plug can be turned around by 180° at any time. Therefore, a single pole switch may disconnect the phase conductor or it may disconnect the neutral conductor, just depending on the plug-in direction of the mains plug.

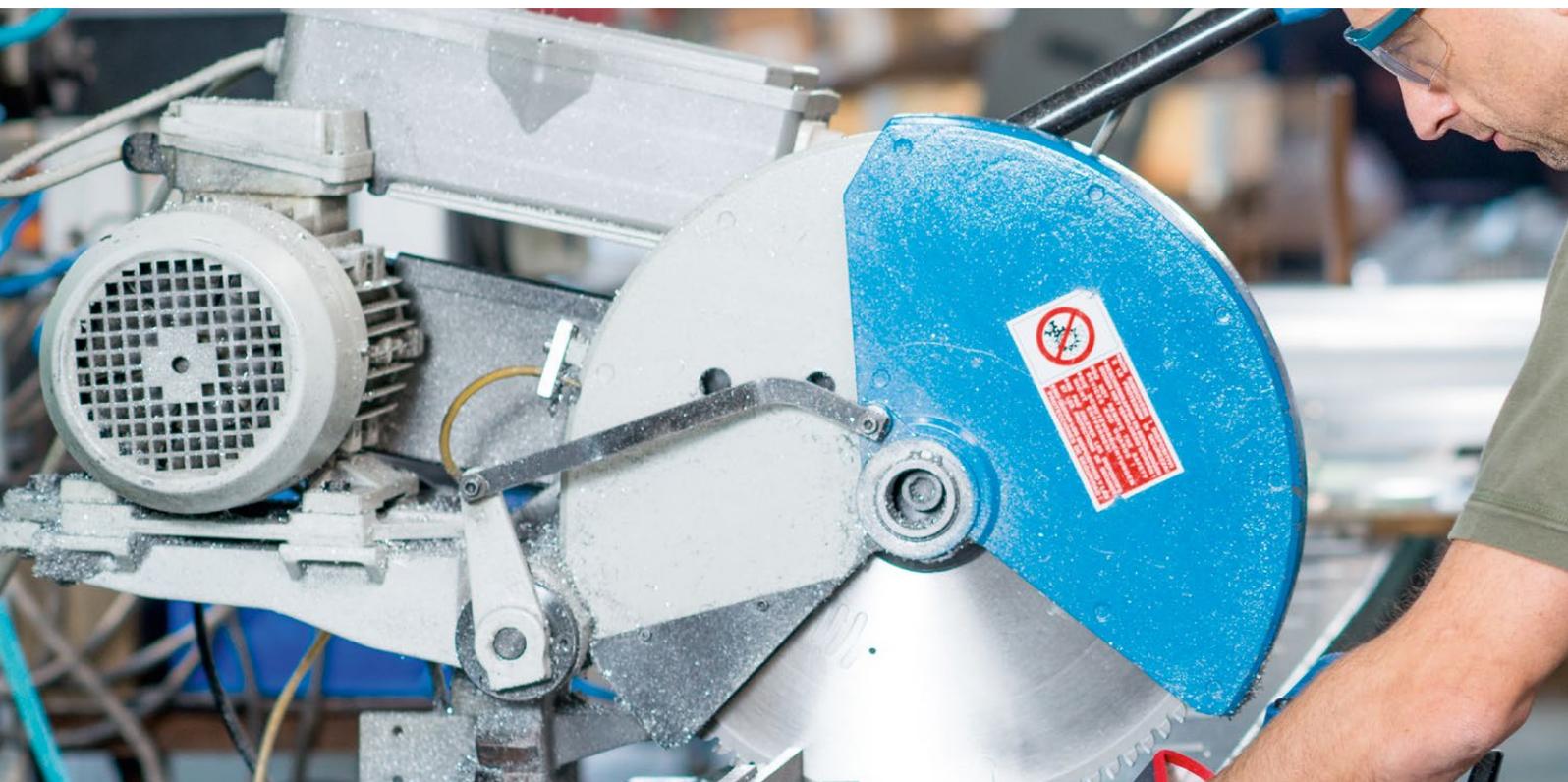
Even single pole protective elements do not reliably interrupt the live phase conductor. All of these elements have slight tolerances in their characteristics and in reality, only the faster overcurrent element will trip, but not both. Again, the likelihood is not more than 50 percent to disconnect the actual phase conductor.



Circuit breaker/switch combination 3120

### A clever combination: Double pole switch with overcurrent trip

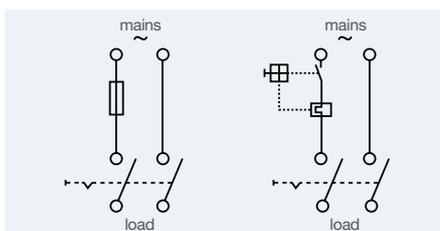
In single phase AC networks with a mains plug, a double pole switch in connection with a double pole circuit breaker for



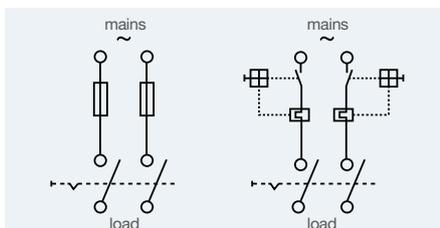
equipment protection is the only way to ensure 100 percent dead-voltage of the loads after disconnection. It does not matter whether the disconnection is initiated manually or by overcurrent trip.

In order to support design engineers in reducing components E-T-A offers the 3120 circuit breaker/switch combinations. It is a double pole switch with the option of integral thermal or thermal-magnetic overcurrent protection.

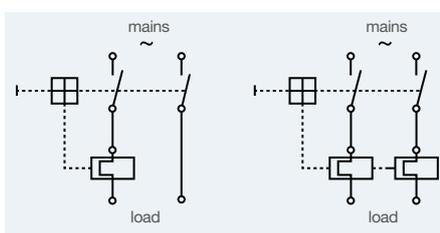
The competitive edge of 3120: Even in the event of an overcurrent the 3120 provides double-pole disconnection, thanks to its latching mechanism. It does not matter whether it is fitted with one or two overcurrent trip elements. This means that even the “double pole version, one pole protected” will always ensure reliable double pole physical isolation.



*Protection provided by a blade fuse or a single pole circuit breaker. No reliable interruption of the live phase conductor!*



*Protection provided by two blade fuses or two single pole circuit breakers. Again: no reliable interruption of the phase conductor! Due to tolerances, in most cases only the faster overcurrent protection element will trip in reality.*



*Protection provided by the 3120 circuit breaker/switch combination: Uncompromised 2-pole physical isolation of phase and neutral in the event of a failure.*

*Circuit breaker/switch combination 3120, double pole switching, **single pole** thermally protected*

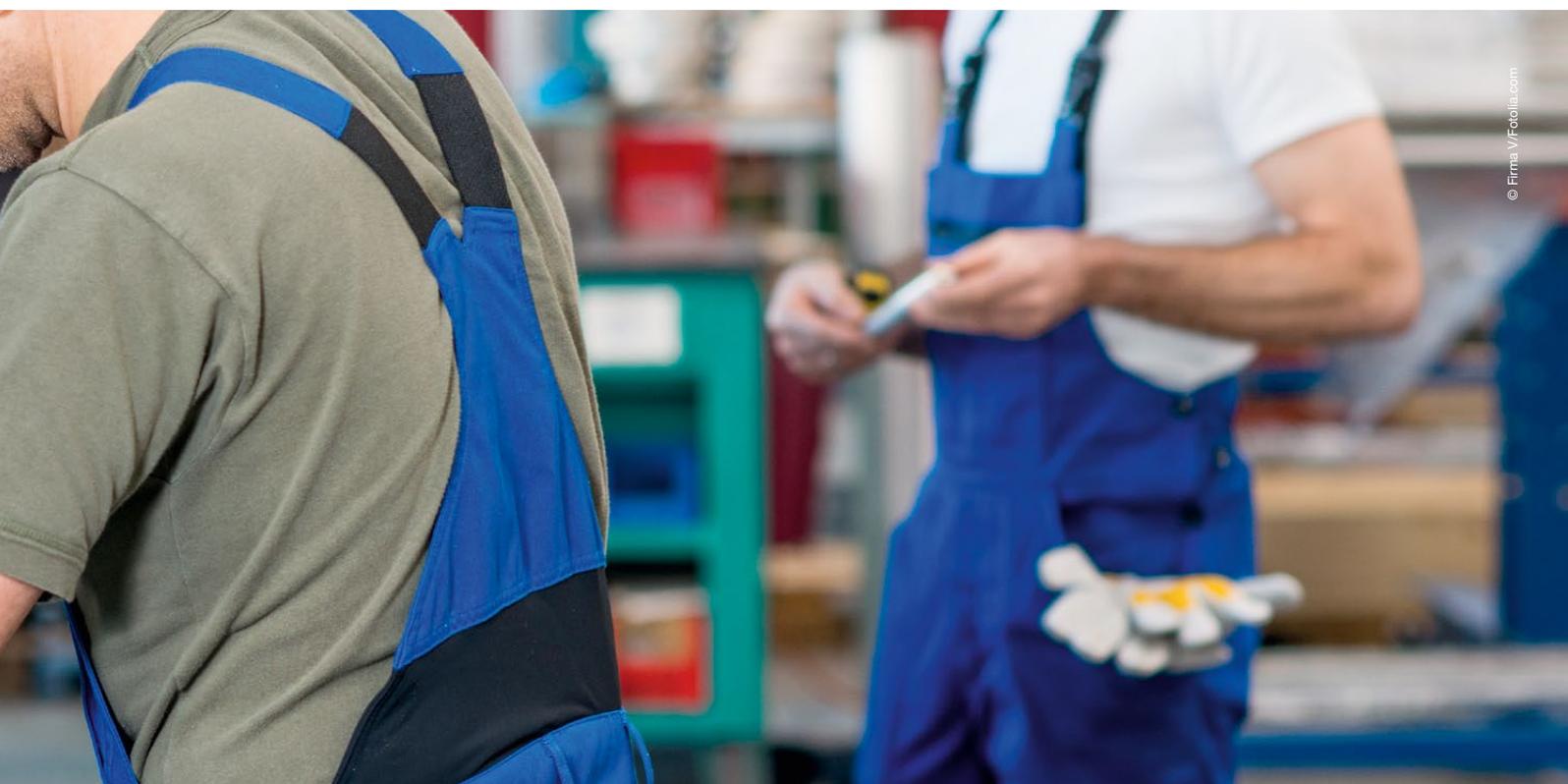
*Circuit breaker/switch combination 3120, double pole switching, **double pole** thermally protected*

**Seven in one:** Example for parts reduction in the event of a 2-pole protection



### Your benefits

- **Time savings:** reduced mounting and wiring time
- **Cost savings:** reduced material planning and inventory costs!
- **Increased availability:** no time-consuming replacement of blade fuses





*E-T-A REX12 circuit protector for DC 24 V offers the best possible price-performance-ratio in automation*

## ■ The perfect choice for everybody!

Modular and standardised electrical design. Quick start-up. Increased machine up-times. Reduced downtimes through well planned maintenance. These are the major trends in mechanical engineering, besides the ongoing “cost reduction” issue. The challenge for manufacturers and end users frequently is to consider all arising expenses required for investment of goods and services in the early stage and over the entire equipment life cycle. The **REX12** electronic circuit protector provides many solutions within a single device.

True customer benefit is also an integral part of adopting a new device or system into an automation concept. The **REX12** platform of the electronic DC 24 V circuit protectors provides precise solutions to many questions:

### **Benefits in purchasing and logistics: »Profit lies in purchasing«**

The **REX12** electronic overcurrent protector has an integral blade fuse as basic protection. This is by far the most cost-effective solution for DC24V overcurrent protection. In addition, single-channel and double-channel devices without accessories for current and signal distribution are extremely economic in purchasing, inventory management and material planning.

### **Benefits for standardisation, planning and electrical design:**

#### **»Low complexity saves time and money«**

A flexible, modular and space-saving design that combines various protection platforms is of the essence. 80 mm installation height allows assembly between cable ducts spaced at intervals of 100 mm. The channel width of 6.25 mm for 2-channeled devices allows a high packing density directly beside the potential distribution terminals.

The **REX12** has identical values of current rating and protection of the fail-safe element. Thus the **REX12** simultaneously protects the integral blade fuse and the load line against overload and short circuit, even in the event of long load lines. The **REX12D** model with IO link interface provides additional features:

- Coupling relay functionality
- Distinction between overload and short circuit
- Adjustment of a current limit value
- Trip counter for repeated overcurrent trips
- Integral current and voltage meter

It also saves money since 16 **REX12D**-channels work on a single **IO link** port.

### **Benefits for control cabinet construction and start-up:**

#### **»Little time means lots of money«**

Snapping the **REX12** onto the DIN rail is quick and easy, no matter if it is only one or multiple devices. Potential and signal distribution is already included with the connector arm. Standard accessories such as busbars are no longer required.



Complete wiring of supply line and load circuits is accomplished with screwless push-in terminals. Compared to screw-type terminals, it saves up 50% of the time.

#### Benefits for production, service and maintenance:

##### »Profit lies in machine uptime«

The **REX12** simultaneously protects the in-built blade fuse as well as the load line against overload: Time-consuming

maintenance or searching for suitable replacements are eliminated. In addition, the output voltage of the DC24V switch mode power supply remains stable in the load circuit in the event of short circuit and overload. This means enhanced selectivity.

System extensions can be done quickly and easily: Just replace the **REX12** model or add another one at the end - done!

## IO-Link



*REX12D with IO link: Industry 4.0 for the field level*



*The REX12 has an integral current and voltage meter.*

### »At a glance«

- **REX12** for standard applications with auxiliary contact, **REX12D** with **IO link** »ready for industry 4.0«
- Current rating of **REX12** equals current rating of blade fuse
- Single or double channel combinations from 1 A to 10 A with a width of 12.5 mm each
- Track-mountable design allows replacement of individual breakers out of the group
- Integral virtual measuring jig for current and voltage in **REX12D**



**Wolfgang Lehmann,**  
responsible for single-disk  
grinders at Schwaborn  
Gerätebau

Use of 1658 thermal circuit breaker in professional grinding machines

## ■ »Gaining a good deal of ground«

For more than 80 years, Schwaborn Gerätebau GmbH, in Germany, has designed and manufactured professional machines for grinding, milling, cleaning and polishing floors. Current talked to Wolfgang Lehmann, who is responsible for the single-disk machines sector, about using circuit breakers to protect the grinding equipment for floor renovation.

**Current:** Your slogan is: »Gaining ground with us«. What does it mean?

**Wolfgang Lehmann:** Our slogan provides a double promise: First of all, when using Schwaborn products you can offer perfect floors, and second, it will strengthen your position and make you more competitive, because our products are developed in conjunction with professional users and new innovations. Therefore Schwaborn products are synonymous with uncompromising economy, reliability, performance and ergonomics.

**Current:** What is the importance of overcurrent protection in your machines?

**Wolfgang Lehmann:** It is very important. Professional machinery requires professional overcurrent protection. It is

vital to us that the circuit breakers used carry international approval marks and that they are as durable and reliable as our machines.

**Current:** You use E-T-A's 1658 circuit breaker in your DSM 250 grinder models DSM. Why this device?

**Wolfgang Lehmann:** It is extremely compact and despite that, it meets all technical requirements. We especially liked the high rupture capacity. We chose the autoreset version so the customer does not have to actively do anything after a trip due to overcurrent. The circuit breaker resets automatically after a few seconds.

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

**Wolfgang Lehmann:** To tell you the truth:

I can't remember, because we have been using E-T-A circuit breakers for more than 30 years.

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



Grinder DSM 250 made by Schwaborn

# 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.*



## Linga Schütz

In mid-2016, Linga joined the TRA Division team as a junior product manager. During her dual or compound studies at E-T-A, she successfully completed both studies in electrical engineering as well as a vocational training as an electronics engineer and familiarised herself with our wide transportation product range. All this will enable her to support our sales force and customers, particularly in terms of E-T-A's high performance circuit breakers.



## Gerson Eisbrenner

Gerson joined the German sales team in August 2016 as a regional sales manager in the North-Western part of Lower Saxony and NRW. After his vocational training at Daimler Benz and subsequent studies in mechanical engineering, he worked as a sales engineer and regional sales manager in the building automation and power management industry. It is Gerson's goal to offer our customer the best possible support with E-T-A's entire product range.

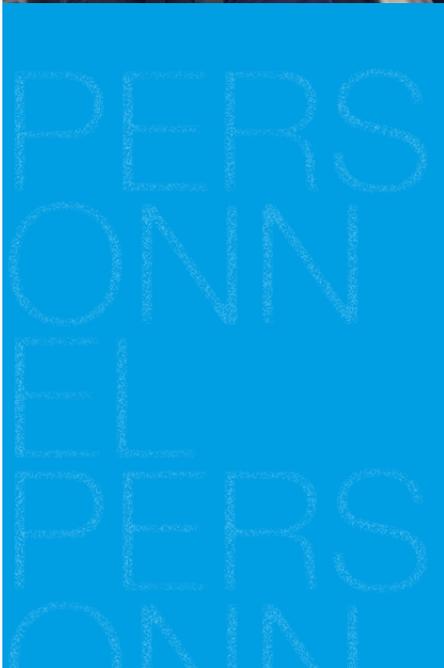


## Frank Hake

In August 2016 Frank started to work for E-T-A as Regional Sales Manager for Northern Germany. He is responsible for several sales offices and his regional responsibility is for the zip code areas 58, 59 and 35.

Frank is a certified electrical engineering technician and he also graduated in business administration. He comes to E-T-A with a wealth of experience, including the power supply industry.

It is Frank's goal to offer the best possible service and advice to the customers in his sales territory in terms of E-T-A's product range, based on his technical background and sales experience.



# FAQ

## Pollutant reduction

»Exhaust emission standards for trucks, buses, construction and agricultural machinery as well as special vehicles«



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)

**Emission reduction is a requirement for newly registered trucks since January 2013, corresponding to the latest standard Euro-6. The requirement became valid for passenger cars in August 2014. For construction machinery the international reference is the North-American exhaust emissions standard Tier4f. There are a lot of interesting questions on this subject.**

**What kind of technologies are being used to meet the emission requirements for motor vehicles?**

For small Diesel motors, a Diesel particle filter is sufficient. However, bigger motors require active treatment of the exhaust gas. This can be done with a catalytic converter - also called SCRT (selective catalytic reduction technology). Among other things a carbamide solution is added to the exhaust gas (brand name "AdBlue) to reduce nitrogen oxide.

**What does it mean for the on-board electrical system?**

A simple and reliable disconnection of the electrical system after switching off the vehicle is not always possible. For example the urea pump has a shut-down delay time of approximately 180 seconds. Before disconnecting the power supply, the carbamide tube is emptied to avoid crystallisation.

**How can you accomplish delayed disconnection of electrical power?**

Until now, purely mechanical battery

isolation switches were used to disconnect the power supply. This is no longer possible. Today, an electronically controlled isolation switch is required. For this purpose, E-T-A offers the **HPR10** hybrid power relay with a delayed OFF function. This function prevents an uncontrolled shut-down of the system which could cause high repair costs.

**Are utility vehicles with controlled battery isolation switches already in use?**

Yes. Both E-T-A's **BMS01** ADR battery isolation switch as well as the **HPR10** power relay are already being used in special vehicles. These vehicles include transportation of heavy goods, mobile cranes, "blue light" emergency vehicles and construction machinery for use in the mining industry.

**How long is the required OFF delay?**

According to the motor manufacturer a delay time of 2 - 5 minutes is required. The **HPR10** provides a programmed OFF delay, i.e. the user can remove the ignition key and leave the car. The relay will switch off the power supply after the specified delay time automatically.



HPR10 Hybrid power relay and BMS01 battery isolation switch



**Ricardo Pimenta**, Dipl. Ing. (FH),  
Techn. Betriebswirt (IHK)  
Product Manager Transportation

In the past, the system voltage was the differentiating feature between a passenger car's on-board electrical system (12 V) and that of a truck (24 V). Electric mobility makes these distinctions more and more obsolete.

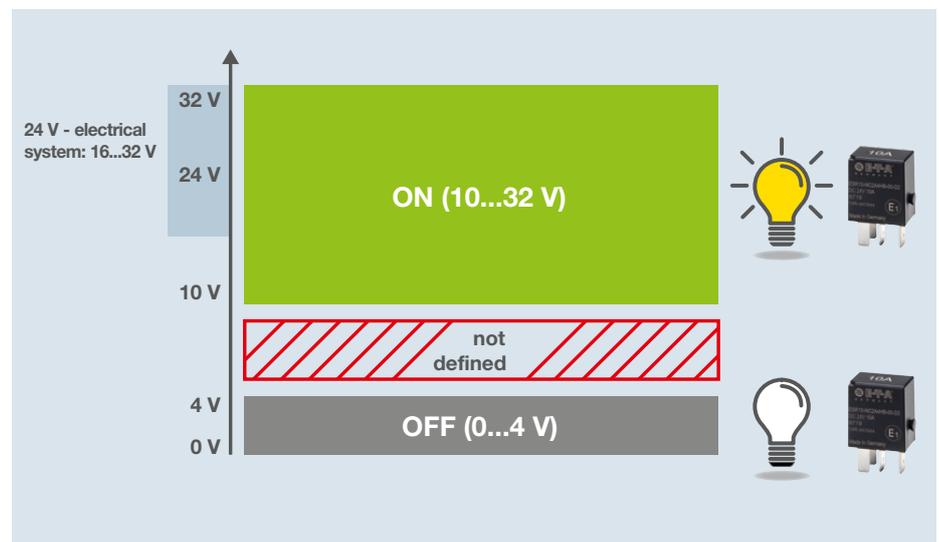
Modern utility vehicles use various on-board voltages of 12 V DC up to 1000 V DC. If we look in particular at the sub-assemblies for 12 V or 24 V systems, E-T-A's **ESR10 solid state relay** reduces 24 V sub-assemblies. This reduces time and efforts and also costs, both during design work and in inventory management of parts and sub-assemblies. The very wide control voltage range (0 V...4 V = OFF; 10 V...32 V = ON) allows activation of a sub-assembly from both voltage levels. This made E-T-A the connecting link between the two on-board voltages. This would never be possible with a mechanical relay.

A car manufacturer gave us an example where this was successfully implemented by using the **ESR10 Micro** in a hybrid series vehicle. Due to the different voltages of the electronic control unit in charging stations (12 V and 24 V) the battery management must be capable of

## ESR10 Micro solid state relay

# In a class of its own

E-T-A's modern ISO Micro solid state relays connect two voltage worlds in a simple manner. This makes applications that were once unthinkable easy to accomplish.



ESR10 Micro 24 V - control level

processing both voltage levels as control signals. No problem thanks to E-T-A's solid state relay as the connecting link!

Compared to mechanical relays, E-T-A solid state relays are not only more flexible, but they are also in a class of their own in terms of endurance, switching speed, temperature development and switching noises.



**ESR10 Micro**  
E-T-A Solid State Relay

*E-T-A types: PowerPlex®, EPR10 and 2210-S*

## E-T-A solutions for many products

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

*Here are some interesting examples.*

## A strong combination

**Göttinger Sonderfahrzeugbau GmbH & Co. KG (GSFB)** is famous for their superior quality and flexibility in a very specific field of special vehicles manufacturing.

Testing and measuring vehicles is very important to the functionality of a car. Under extremely confined conditions, testing and measuring jigs are installed without compromising working convenience.

GSFB specialises in designing interior equipment for cars and has designed their own power supply concept, combined with various E-T-A products, to ensure vehicle uptime. The latest overall concept they presented met with extreme interest as it minimises closed circuit current input significantly. Small loads are controlled,

monitored and protected with two **PowerPlex®** Mini Modules. Power supply of the modules is separately via two batteries. When you park the car, E-T-A's EPR10-P protective relay disconnects the battery supply for the measuring equipment and one **PowerPlex®** Mini Module.

Another **EPR10-P** monitors the load current and the thermal load of a DC/DC converter in the vehicle. In the event of critical values, the devices will automatically interrupt the circuit. Major loads, such as a telescope motor, are protected separately via E-T-A's **2210-S** circuit breaker.



*E-T-A Types: PowerPlex®, EPR10-P and 2210-S*



*E-T-A Type: 3600*

## ■ Ensures a reliable telecom network down under

**AC&E**, located in Sydney (Australia), are committed to servicing the telecommunications industry through design, manufacturing and continuous innovation. Their products are developed and configured to meet the performance characteristics for clients locally and worldwide.

AC&E's Alarm and Power Distribution Panel APDP007 is designed for telecom and utility applications that require dual feed 24 or 48V DC supply. The panel mounts in a 19" or 21" rack and provides 16 outputs that are protected by E-T-A's **3600** circuit breakers. AC&E selected E-T-A's **3600** circuit breakers for their quality, reliability, small footprint, socket mounting, auxiliary contacts and mid-trip state. The mid trip state is technician initiated to indicate the circuit is receiving attention. The **3600**'s auxiliary contacts are accessible to the user via the APDP007's Krone IDC array for

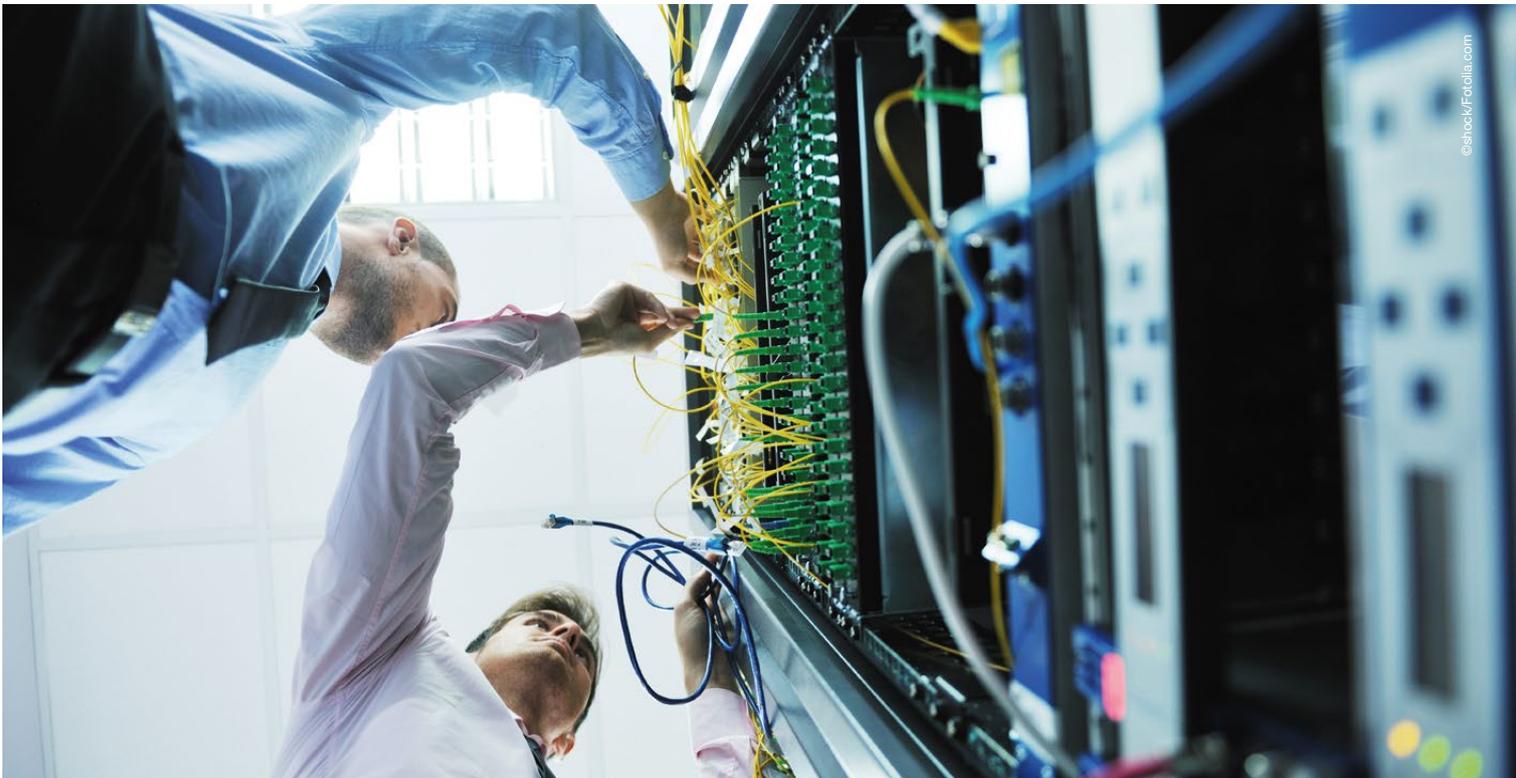
customised user applications. In addition to power distribution the APDP007 provides external equipment alarm aggregation, prioritization, signalling and transmission thus integrating additional functionality within the rack space. Internal alarm conditions are generated and user prioritised from tripped breaker, under/over voltage feed, mid-trip and missing feed. All connections to the APDP007 are fully accessible from the front of the panel while rack mounted making it fast and easy to install and maintain.



Power distribution system APDP007 from AC&E



E-T-A Type: 3600



E-T-A **PowerPlex**® on the road in Australia

## Showroom on wheels

Mobile showrooms are an attractive alternative to conventional shops and are used in various applications. In Australia, Empire Vehicle builds custom business vehicles for a wealth of purposes.



Empire Vehicles uses **PowerPlex**® for various functions to ensure reliability of the business vehicles.

Empire Vehicles is an Australian manufacturer of special vehicles located near Sydney. Since 1999 they have produced and rented vehicles (brand name: Empire Film Services) for the movie and TV industry, e.g. make-up or wardrobe trucks. 10 years ago, Empire Vehicles extended their range. Since that time, the second string to their bow is the customer-specific construction of special vehicles, e.g. mobile showrooms and offices or catering and food trucks.

For the Snap-on Tools Australia franchise vehicles, Empire Vehicles relies on **PowerPlex**®. By means of the mobile sales units, the tool comes directly to the customer. Snap-On has a vast franchise business model and therefore vehicle uptime and presentation is an essential factor of success.

The **PowerPlex**® system controls the electrical functions in the showroom and

monitors the tank levels as well as the battery status. The user interfaces, which are designed specifically for the vehicle, are displayed on the **PowerPlex**® Touch Panel 7.0“.

By means of “Entry Mode”, interior and exterior lighting can quickly be switched on and the level sensors of the tanks are ready for use. As soon as the work is done, the user can switch off any loads that are no longer used via the “EXIT mode” to avoid any unnecessary power consumption. The integral temperature sensors of the **PowerPlex**® system also provides the current temperature values inside and out on the display. For protection purposes, there are several alarms and pop-up messages that indicate undesired operating conditions of the on-board electrical system in real time.

One of the other major benefits Empire Vehicles found with **PowerPlex**® is



Individual user interfaces according to customer specification



the ability to quickly and efficiently develop configurations specifically for the clients needs. The systems are provided with harnesses, connectors and are pre-programmed for plug and play installation saving valuable manufacturing time on these vehicles.

# CULINARY DELIGHTS

*Typical Australian:*

## »Australian Porridge«

*The Australian cuisine is not only famous for its specialties with meat, fish and seafood, but it also offers interesting and healthy breakfast recipes which are unmistakably influenced by English cooking.*

### Directions

Put water with a pinch of salt and the raisins in pot, not too wide, and bring to boil. Gradually add oat flakes and stir, reduce heat. Bring to a simmer until thickened slightly. Stir well to prevent the porridge from sticking to the pot. After about 5 minutes, fold in thin slices of banana.

Put into a cereal bowl and sprinkle with sugar, add almonds and milk to taste.

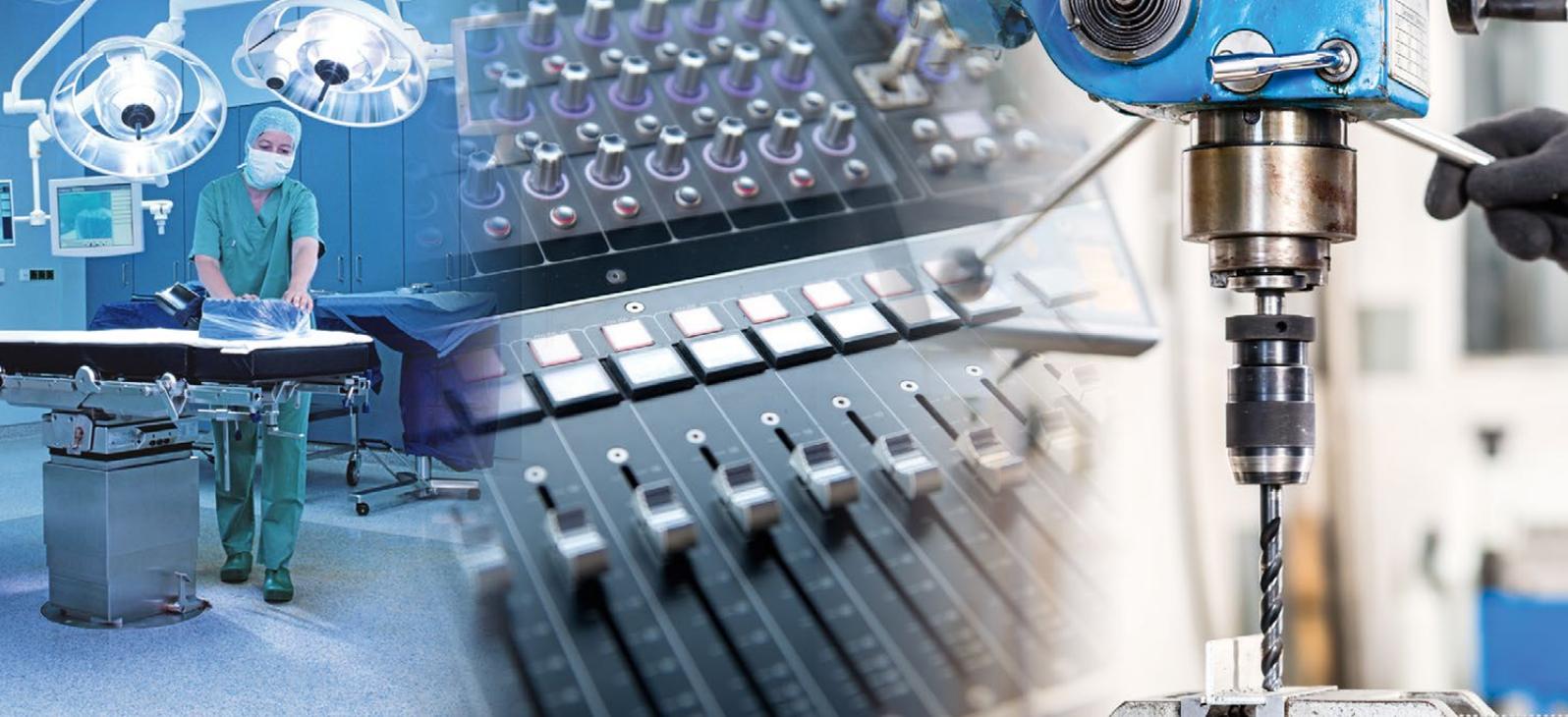
### Ingredients

- 1 1/2 cups of water
- 1 cup of porridge oat flake
- 1 cup of milk
- tbsp raisins (optional)
- 2 tbsp cane sugar
- 1/2 banana
- 1 tbsp roasted whole almonds
- 1 pinch of salt



Typical Australian  
»Australian Porridge«





# 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\\_e1-17](http://www.e-t-a.de/cu_e1-17)



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