

A clever way to save space

Circuit breakers with integral auxiliary contacts



Reliability counts.

Why you can rely on a strong brand.

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CPC20

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The smart ConAG relay

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Compact and robust

1658 resettable circuit breaker
protects fans.

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Impressum

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Elektrotechnische Apparate GmbH

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■ Reliability counts.

Why you can rely on a strong brand.

Maybe this occurs to you as well sometimes: You feel like trying a new supplier, a new offer - this can sometimes be reasonable or attractive. But in some respects it's important that you can 100% rely on a supplier. Experiments can be risky business when it comes to safety and reliability - values that no one wants to compromise.

Because of this, we often have repeat customers relying on the E-T-A brand for many years. They know E-T-A is synonymous with unrivalled reliable, high-quality engineering. Any product or system using E-T-A devices becomes better and more reliable. For seven decades E-T-A has protected the lives and values of our customers and we consider this the quintessential responsibility of our business. Anyone responsible for protective components simply cannot afford to choose a cheaper product and put safety on the line. In the end, there is much more at stake than a slight price difference.

This is why the E-T-A brand matters so much to us. We truly want to ensure that you can rely on E-T-A - always, everywhere and without hesitation. Whenever you make this decision. Choosing E-T-A becomes even easier with our expertise in engineering innovations and our globe-spanning network - we are always within reach for our customers. And we are a fair partner, without reservations or conditions. And one thing remains at the centre of it all: We protect the lives and values of our customers. And this is a fact: You can rely on the E-T-A brand.

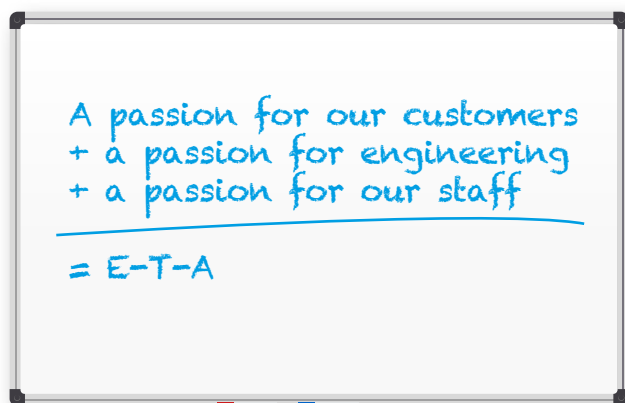
Do you have any questions? Please get in touch. Or do you know of a certain project you wish to discuss with us? **We look forward to speaking with you.**



Dr. Clifford Sell

Executive Committee

E-T-A Elektrotechnische Apparate GmbH



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

CPC20 bus controller, **Module 18plus** power distribution system and **ESX60D** electronic circuit protector

Next Generation: **ControlPlex® Controller CPC20**

Digitisation of industrial work areas is evolving. Individual products, short lead times and international competition pose new challenges to industrial production. One reason could be the rising degree of digitisation in the production environment. A vital requirement is the consistent data availability throughout all levels.

CPC20 bus controller offers comprehensive interfaces

The new **CPC20PN** bus controller of the intelligent **ControlPlex®** product group is absolutely up to the task. Besides standard field bus connection, i.e. via Profinet (CPC20PN), it also offers optional communication via OPC UA and MQTT. The integral web server also allows quick and convenient data collection and analysis. This ensures unrivalled transparency in the DC 24 V power supply and quick detection of deviations in the current consumption of the various loads. It allows users to resolve deviations from standard conditions before a failure

occurs. Condition monitoring leads to improved machine uptime and a stable production process. In the event of a failure, remote access to individual **ESX60D-S** electronic circuit protectors helps significantly reduce downtimes. The software can identify the causes of failures such as short circuit or overload by analysing the trip behaviour and can help the service staff with trouble-shooting.

Trouble-shooting in the event of a short circuit should start in or near the control cabinet, because it is most likely a supply line was damaged or that a component is defective. If the electronic circuit protector

tripped because of an overload, search for the root cause of the failure should start at the connected load. This leads to faster failure detection and a quicker system re-start.

Module 18plus for a flexible and modular design

The modular design of the **Module 18plus** allows system flexibility which can be tailored to user's requirements. The **Module 18plus** is directly connected with the **CPC20**. The system allows power distribution of up to 80 A. Supply is via the supply module. The output modules are protected by **ESX60D-S** protectors with



push-in terminals are directly assigned to the individual load circuits. This saves valuable wiring time and guarantees a clear layout of the DC 24 V power distribution.

The new ESX60D: space-saving and smart

The new **ESX60D-S** electronic circuit protector is a plug-in type and has room for two channels in a width of only 12.5 mm. These can be adjusted in a current rating range from 1 to 10 A via the **CPC20** bus controller, allowing maximum

flexibility and minimal complexity. Active current limitation enables the protection of any load. This is also true for long cable lengths, i.e. in plant engineering and construction, and their associated problems.

ControlPlex® Tools ensure fast integration

We supply all required software components that allow integration of the system in all standard project surroundings free of charge. This allows quick system installation and easy start-up.

Your benefits



- Enhanced system availability through transparency and remote access
- Ease of adjustment to customer needs through modular system design
- Quick reconnection through quick trouble-shooting



CPC20
Buscontroller



ESX60D-S
Electronic circuit protector



Module 18plus power distribution system fitted with **ESX60D-S** electronic circuit protectors and **CPC20** bus controller



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Circuit breakers with *integral auxiliary contacts*

■ A clever way to save space

In many applications, an overcurrent trip requires a visual or acoustic signal or information sent to a control unit. Typically, this is accomplished by auxiliary contact modules. However, if space is limited, circuit breakers with integral auxiliary contacts are the ideal solution.

If an MCB installed in private apartment trips, for instance if too many electrical loads were inadvertently connected to a power strip, the residents will notice that immediately. The lights go out; the TV set is muted and kitchen appliances stop operating. This may be annoying, but normally does not have any catastrophic consequences. The tripped circuit breaker can quickly be identified and reset in the fuse box.

In industrial manufacturing environments, this is completely different. A tripped circuit breaker can cause entire production lines to come to standstill. Therefore, quick trouble shooting and resolution are incredibly important. The snag: in such a surrounding, there can be hundreds of circuit breakers installed for equipment protection. The question is now: How to quickly identify which of

them tripped? And the solution is: The circuit breaker gives either a visual or an acoustic signal and ideally, this alarm is also forwarded to the control room. This can work with auxiliary contacts. It is a second contact system, physically isolated from the main contact system of the circuit breaker. Its contacts open or close in the event of an overcurrent trip because it is coupled with the main contact system. Numerous alarms and sequential circuitries - such as parallel or series connections - can easily be implemented.

Therefore, many MCB manufacturers offer auxiliary contact modules. They can be mounted side-by-side with the MCB and can easily be coupled with the circuit breaker. However, the add-on module requires additional 9 mm of space. What can be done if space is limited? The

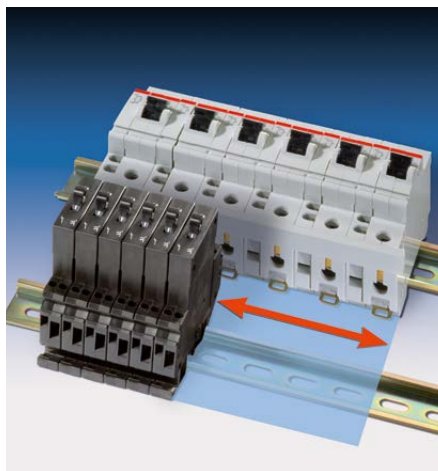
solution is a circuit breaker with integral auxiliary contacts. For example E-T-A's 2210-S thermal-magnetic circuit breaker. The auxiliary contacts are included in the standard device and do not require additional space, even though the **2210 circuit breakers** feature a **standard width** of only **12.5 mm**. Compared to MCBs with auxiliary contact modules, this equates to approximately a **50% reduction in space**.

In apparatus and machine construction or in medical equipment, space often is at a premium. These applications often only require pure overload protection, E-T-A also offers purely thermal circuit breakers with integral auxiliary contacts. For example E-T-A's **2-6400** offers two integral auxiliary contacts. Another best-selling product in the E-T-A range is type 104. It is as small as two sugar



cubes and is the smallest thermal circuit breaker in the world with integral auxiliary contacts.

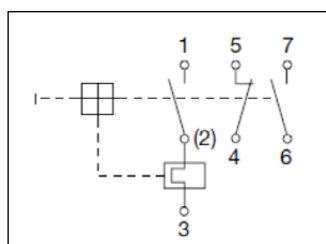
The **104** has robust standard blade type terminals. It can also be specified with soldering pins for PCB mounting. The auxiliary contacts of **type 104** indicate overcurrent tripping to the controller which can subsequently initiate any required action, for instance more disconnections.



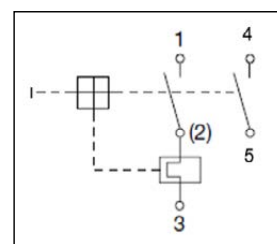
E-T-A 2210 Circuit Breaker: 50% space savings compared to conventional MCBs thanks to integral auxiliary contacts

Your benefits

- Compared to MCBs, the **2210** with integral auxiliary contacts requires **50% less space**.
- The **2-6400** thermal circuit breaker features a very compact design, but holds two integral auxiliary contacts.
- E-T-A's **104** thermal circuit breaker is the smallest thermal circuit breaker in the world with integral auxiliary contacts.



E-T-A's 2-6400 with two integral auxiliary contacts (1 N/C + 1 N/O)



E-T-A's 104 with shunt terminal and integral auxiliary contact (1 N/O)



Using **ESS31-T** electronic circuit breakers in brewery systems

■ Safety for superior quality

The **Warsteiner Brewery** was founded in 1753 and is one of Germany's largest privately owned breweries. Their flagship is the Warsteiner brand, one of Germany's leading pilsner brands. We talked to Erik Fechner from the Engineering & Support / Projects & Maintenance Department about the protection of the brewery equipment with E-T-A's electronic circuit breakers.

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

Erik Fechner: E-T-A Elektrotechnische Apparate GmbH is one of the leading companies for circuit breakers for equipment protection and circuit protectors. We talked to E-T-A for the first time at the 2016 Hanover Fair. Guidance and advice on site was very good and above all comprehensive. After we processed all information gained during our discussions at the fair, we had the opportunity to discuss all operational requirements with an E-T-A sales engineer who helped us to select the suitable product.

Current: Where do you install E-T-A's circuit breakers?

Erik Fechner: We specified the ESS31-T electronic circuit breaker as our new factory standard. It will now gradually be introduced in all areas of our plant.

Current: What is your experience with E-T-A circuit breakers so far?

Erik Fechner: Our experience with the circuit breakers is very positive throughout. We particularly like the electronic trip curve including the active linear current limitation. In the event of a short circuit or overload, it responds faster than the switch mode power supplies we use. The supply voltage remains stable. Only the faulty load path is selectively disconnected. It significantly contributes to our system availability and reliability.

Current: Why did you choose the ESS31-T, i.e. an electronic circuit breaker with physical isolation, and not "only" an electronic fuse?

Erik Fechner: The determining factor was our internal requirement for physical isolation to reliably eliminate leakage currents. Conventional electronic fuses do not offer this safety feature.

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.*



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Yoshihiko Kihara

In June 2017 Yoshihiko Kihara (41) joined E-T-A Japan to further develop "Transportation" market in a systematic and structured way. His major task, besides his regular sales tasks, is to identify new business opportunities as well as manage existing accounts in the automotive sector.

Yoshihiko Kihara graduated in Japan and he has a wealth of technical experience from his previous roles. His capabilities and personal qualification will certainly help him advise our customers technically as well as benefit from the international co-operation with his global colleagues.



Konrad Sörgel

In September 2017, Konrad took over the marketing management of the medical equipment, professional tools and apparatus engineering markets. Besides further developing these markets, he will also look at extending the product range.

Konrad studied business administration in Munich. Apart from comprehensive experience in international marketing in the industry, he also has sound technical understanding. With this background, Konrad will be able to develop appropriate solutions for the customers in his focus markets.



Philipp Teepe

In June 2017 Philipp Teepe became Business Field Manager for trucks and buses in the Transportation Division. He studied industrial engineering and management in Esslingen as well as B2B marketing in Berlin. He came to E-T-A with a wealth of experience in sales and marketing of automation solutions for machine and panel builders as well as electrical drives for utility vehicles and special vehicles.

It is Philipp's goal to support E-T-A customers worldwide in the truck and bus market with custom protection solutions and innovative new products.



FAQ

What does »all pole breaking« mean?

In everyday life, we often use technical terms that we no longer think about because they have become common vocabulary. One of these expressions is "all pole breaking". What are the relevant standards?



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

What is »all pole breaking« of AC voltage?

According to DIN EN 60335-1:3.8.1¹, »all pole breaking« means the interruption of both line feeds via a single switching operation or, in the event of multi-phase devices, the interruption of all line feeds with a single switching operation.

Concerning DIN VDE 0100², the PEN conductor in a TN-C system cannot be disconnected or switched off. Every active conductor must be disconnected. The exception is the neutral conductor in the TN-S system. However, disconnection of all active conductors including the neutral conductor is recommended for the TT system. Hence a four-pole disconnection is recommended, and the breaking pole for the neutral conductor must open late.

What is »all pole breaking« of DC voltage?

The DIN EN 50162³ requests complete isolation and all pole (L+ and L-) protection with ground-fault monitoring for unearthed systems. This means that both conductors must be disconnected from the supply system in the event of a failure. Single pole protection is sufficient if the L- is grounded. Ground connection must then be effected in only one spot.

What are the requirements of mechanical engineering in DC24V networks?

The Machinery Directive 2006/42/EG⁴ and the associated standard EN 60204-1⁵ request all pole breaking in the event of

a failure. E-T-A's ESS22-T double pole electronic circuit breaker with physical isolation meets these requirements and can be used for such applications in DC24V systems.

What are the relevant requirements for high voltage on-board electrical systems?

The LV 123⁶ defines the requirements and tests for high volt components in electric and hybrid vehicles. This delivery specification was drawn up by the German car manufacturers AUDI, BMW, Daimler, Porsche and Volkswagen and serves all for the approval of high voltage components. It was first issued in November 2009.

The LV 123, 8.5.2 clearly requests all pole breaking of the HV system of the DC HV circuits. At least one pole must be cut off mechanically by means of a contactor. The second pole may also be disconnected by means of a semi-conductor switch. The switchgear has to be installed in a way so as to ensure possible disconnection of the current flow in both directions.



ESS22-T:
double pole electronic circuit breaker
providing physical isolation

¹ DIN EN 60335-1:2012-10; VDE 0700-1:2012-10 Household and similar electrical appliances - Safety - part 1: General requirements

² DIN VDE 0100 part 460/VDE 0100 part 460: Erection of high-voltage installations with rated voltages up to 1000 V - Protection; Disconnection and Switching

³ DIN EN 50162:2005-05; VDE 0150:2005-05 Protection against corrosion due to stray currents from direct current installations

⁴ Directive 2006/42/EG of the European Parliament and of the Council of 17 May 2006 on Machinery and amending directive 95/16/EG

⁵ EN 60204-1 Safety of machinery, electrical equipment of machinery, para 9.4.3.1

⁶ LV 123 Electrical properties and electrical safety of high voltage components in motor vehicles



Michael Massa, M. Sc. (Agriculture),
Business Field Manager Transportation

EXR10 solid state relay

The smart ConAg solid state relay

The **EXR10** solid state relay, part of E-T-A's smart relay product group, is capable of intelligently controlling numerous electrical loads.

Construction machinery and agricultural vehicles have special technological demands due to the harsh environmental conditions that they are operated in, including extreme temperatures, humidity, dust, shock and vibration. E-T-A's **EXR10** solid state relay proves itself with robust technology and design.

The **EXR10** is a special timer relay that can easily be integrated into existing system designs – making it the ideal product for OEMs. This is particularly true if additional loads are connected at a later date that must be protected. Features like the freely selectable time slots for “ON delay” and “OFF delay”, the integral diagnostic function, low voltage detection, wire break detection and overcurrent and short circuit protection contribute to a high performance and enhanced uptime of machinery.

Other possible applications include:

- Overtravel function for the exhaust aftertreatment of diesel motors with configurable time slots
- Controlling frequency and intervals of fans for the reverse function
- Monitoring the load condition of various feed pumps to effectively prevent a dry run
- Fast detection of defective acoustic reversing signals through wire break detection
- Maintaining a stable connection set-up for the exchange of telemetric data even with the ignition key removed.



*Keeps agricultural and construction vehicles running, even under the harshest conditions: the **EXR10** solid state relay*

E-T-A types: PowerPlex® product group

A smart network

Concorde Reisemobile GmbH is a German manufacturer of high end mobile homes. Throughout the industry, Concorde is synonymous with innovative design and high quality standards for more than 35 years.

As a first-class manufacturer, Concorde develops their own vehicle concepts. The Centurion is the flagship of their model range and excels with its ultramodern interior, its sophisticated furniture design and its smart on-board electrical system.

The E-T-A **PowerPlex®** creates space for new ideas for example by eliminating conventional light switches. The illuminated **PowerPlex®** keypads immediately catch the eye and support the innovative vehicle concept. Thanks to the **PowerPlex®** mini modules, the LED illumination inside and outside the vehicle can easily be dimmed.

Loads with a high current consumption, for example the electric motors operating the step treads or the roller blinds, are protected and controlled with the **PowerPlex®** compact modules.

Tank level indication, visualisation of battery condition, and switching of loads is accomplished with E-T-A's 7" touch display. This is already a standard in their premium models. Thanks to the new **PowerPlex®** web server, the owner of a Centurion can now use any smartphone to control and monitor the operating conditions of his vehicle.

E-T-A solutions for many products

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

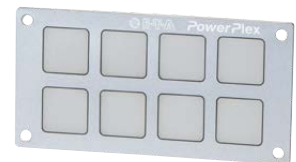
Here are some interesting examples.



PowerPlex® Mini Module



PowerPlex® 7" Touch-Display



PowerPlex® Keypads



E-T-A type used: SBG V0146

■ Transportation safe and easy from a “one-stop” service

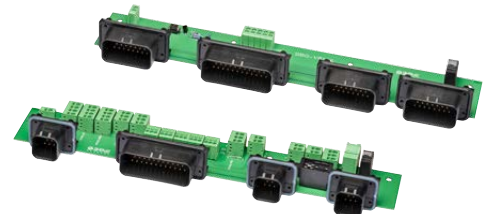
The **KS Control GmbH** located in Mintraching, Germany, near Regensburg is a major manufacturer of automation, control and inspection solutions. They design, build and sell production and control processes on behalf of their customers.

For this project, their dynamic design and sales team worked out synergies of an ultramodern production process by smartly linking automation, process control and robotics. The goal: safe transportation on construction sites in connection with a custom and reliable positioning of glass elements. KS Control has many years of experience in the automotive industry, foodstuffs and beverage as well as the electronic industry and therefore are a very innovative and creative partner for their customers. The »Glassworker GW625« project for the ERGOMount Systems GmbH

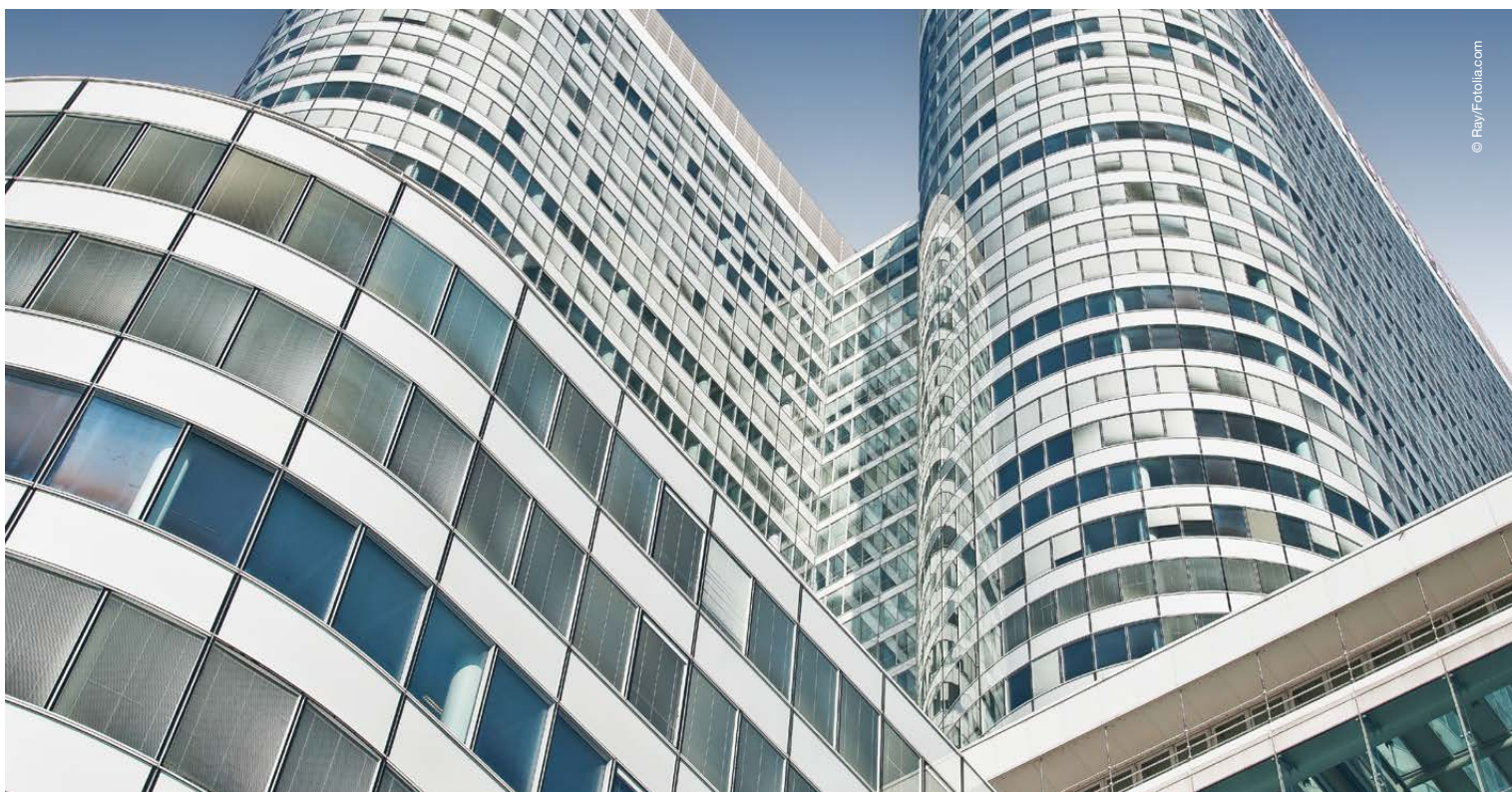
is a remotely controlled glass lifter which can lift, transport and precisely position any objects with a smooth surface with vacuum suction cups.

E-T-A supplies two centralised distribution boxes, based on printed circuit board technology, collecting, arranging and distributing cable connections in a clear, space-saving lay-out. The interfaces to the loads feature a plug-in design to ensure fast and efficient mounting, E-T-A also supplies an enclosed protection pcb of the control elements providing ERGOMount a single source solution for the system.

»Glassworker GW625« of the ERGOMount Systems GmbH



E-T-A type: SBG V0146



1658 resettable circuit breaker protects fans.

Compact and robust

Established in 1980 in Burlington, Wash., **DRI-EAZ** developed the first “Purpose-built” airmover which quickly revolutionized the restoration industry. E-T-A’s manual reset circuit breaker type 1658 provides reliable overcurrent protection of airmover motors.



*Ensures a fast drying process:
the mobile airmover VELO made by DRI-EAZ
photo: DRI-EAZ*

Dri-Eaz’ mission is to help customers improve and restore indoor environments by providing the best portable products and solutions. Over the years, Dri-Eaz has brought the restoration industry a number of industry firsts, including the first inter-air drying system and the first industry-specific moisture detection instruments.

Professional devices (like airmovers) demand professional overcurrent protection. Therefore Dri-Eaz chose E-T-A circuit breakers for use in airmovers that are protected by thermal E-T-A reset-circuit breakers type **1658**. While compact

in design, this circuit breaker type **1658** is an extremely powerful and reliable overload protector. In case of an excessive overcurrent (e. g., a blocked motor) the breakers disconnect the airmovers from the power supply and avoid motor damage. This assures Dri-Eaz customers a long lasting (durable) airmover. E-T-A type **1658** carries international approvals like VDE, UL and CSA which allows for product use all around the world.



*thermal reset circuit breaker
type 1658*

CULINARY DELIGHTS

Typical American:

**»Coleslaw –
delicious and
typically American«**

*The word “coleslaw” stems
from the Dutch word
“koolsla” which actually is
a salad made of cabbage.*

In the USA, but also in England, Ireland and Australia, coleslaw is a very popular side dish. There are many, regionally different recipes for coleslaw, but what they all have in common is a dressing based on mayonnaise. Coleslaw perfectly goes with barbecue, fish and chips or all kinds of burgers.

Directions

Mix finely shredded cabbage with finely grated carrots in a bowl. Add grated caraway seed, put on a lid and rest for approx. 20 minutes.

Mix ingredients for the dressing: juice of lemon, mayonnaise, sour cream, cream and vinegar. Add salt, pepper and sugar to taste. Add to cabbage and carrots mixture and mix well to combine. Put bowl in the fridge and rest for at least 2 hours.

Add parsley before serving.

Preparation time: 30 minutes

Resting time: 2 hours

Ingredients

- 1000 g white cabbage
- 3 carrots
- ½ tsp caraway seed
- 1 lemon
- 150 g sour cream
- 100 g mayonnaise
- 100 g cream
- 1 ½ tbsp white vinegar
- 1 tsp mustard
- 2 tsp cane sugar or sugar
- salt, pepper, parsley (fresh or dried)



*Typical American
»Coleslaw«*

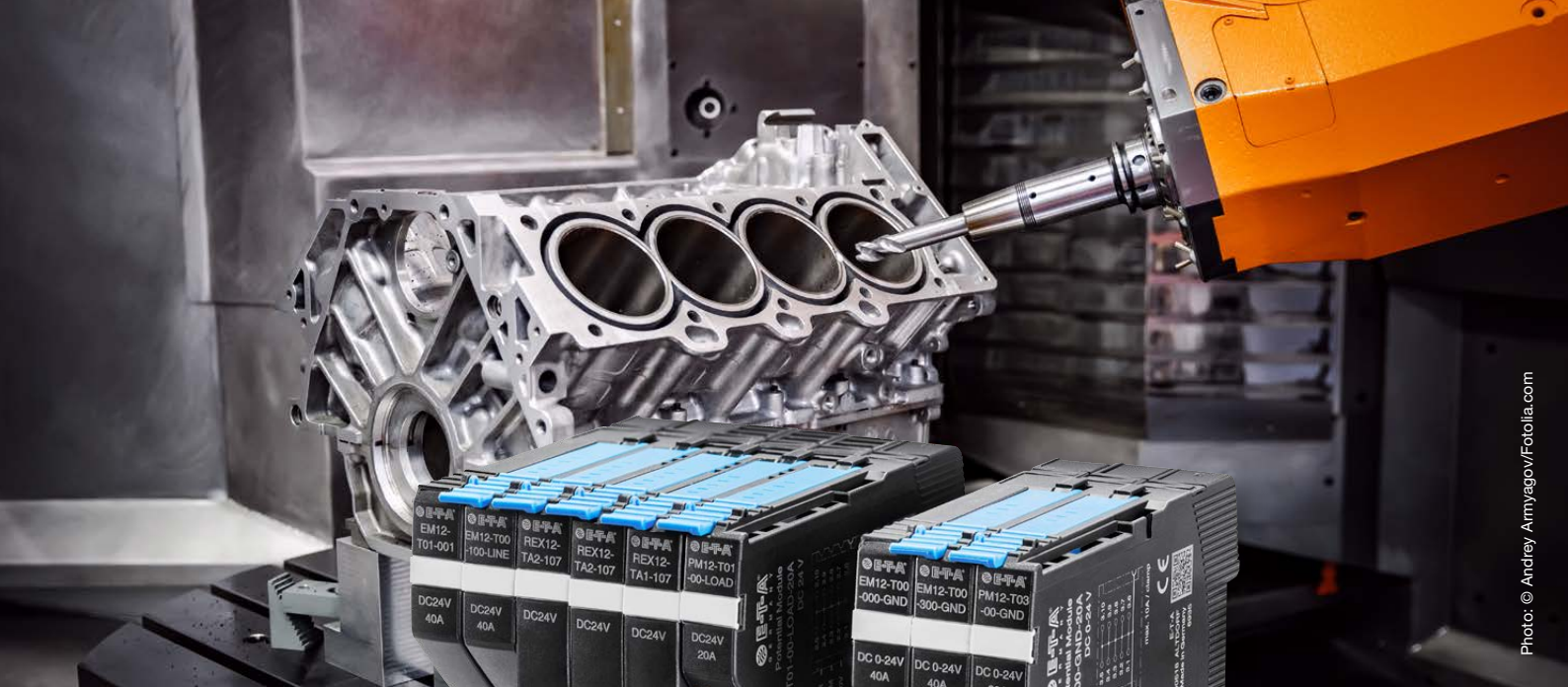



Photo: © Andrey Armysgov/Fotolia.com


REX12 - the exclusive way of complying with the machinery directive



The REX system – your all-in-one solution

The REX12-System consists of three components - **supply, overcurrent protection and power distribution** - and revolutionises your DC 24 V level.

- **Increases machine uptime** – through clear failure detection, high transparency and remote diagnosis
- **Flexibility is ensured** – through ease of assembly or disassembly, modular design and convenient adjustment
- **Saves 50 % time** – through innovative and flexible connection technology
- **Saves costs** – since no further accessories are 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/cu_e1-18



 ENGINEERING TECHNOLOGY

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