

This breaker won't leave you out in the rain

IP65 rated 3120 thermal circuit breaker

Dual leadership

Making E-T-A a family
business all round

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ESX10-T electronic circuit
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»Lívance«

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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

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Dual leadership

Making E-T-A a family business all round

E-T-A is a family business - through and through. Therefore, I am very glad my brother Dr. Clifford Sell and I have joined together to form dual leadership as Directors of our long-established company. It is our goal to live and implement our vision of a consistently collaborative, co-operative and networked company, a company that will continue producing profitably in Germany for years to come. I cannot imagine Germany, nor Europe, as a society working solely as service providers. In my point of view, and from the macrosocial perspective, we also need to keep working in production. I am ready to make my contribution here in my new role with E-T-A.

As Head of E-T-A Production Facilities, I have worked at E-T-A for many years. Hence I know our markets, our customers and our products very well. I am very proud I now have the opportunity to promote the E-T-A mission of protecting lives and values also as a Director. No matter what industrial branch you work in, you can always rely on E-T-A protection solutions. Seven decades of experience and a strong focus on innovation helps us to make sure of it. Elements of overcurrent protection essentially contribute to the safety of countless products. Our customers do not want to take a risk in critical situations and rely on E-T-A. I am very happy about that.

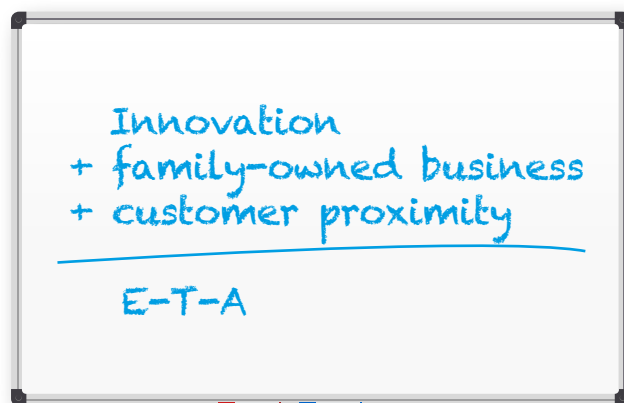
What can we do for you and your products? Please get in touch. Or do you know of a certain project you wish to discuss with us? **We look forward to speaking with you.**



Dr. Jennifer A. Sell

Director of

E-T-A Elektrotechnische Apparate GmbH



ESX10-T electronic circuit protector for DC 48 V circuits

■ The drive is safe

Overcurrent protection is now available for DC 48 V drive engineering: It is often challenging in mechanical engineering to have precise positioning or fast transportation. In many environments, stepping motors or servomotors are used to accomplish these complex motion-sequences. E-T-A now offers protection solutions specifically for these applications.

How are DC 48 V drives protected properly?

The simple answer is: Electronically! Primary pulsed switch mode power supplies often act as the voltage supply in DC 48 V applications. Switch mode power supplies are very reliable. However, their power reserves are limited in the event of an overload. These are often only 1.5 times rated current.

Theoretically, even if a short circuit exceeds this value, the power supply will protect itself and turn down the output voltage. If a thermal-magnetic MCB is used at an output like this, it will not be able to disconnect because the switch mode power supply is not able to supply the current needed to trip the MCB.

This is exactly where electronic circuit protectors should be used. Electronic overcurrent protection devices mirror the characteristics of switch mode power supplies. They are very fast in the event of a short circuit and slower when switching on high current-consuming loads.

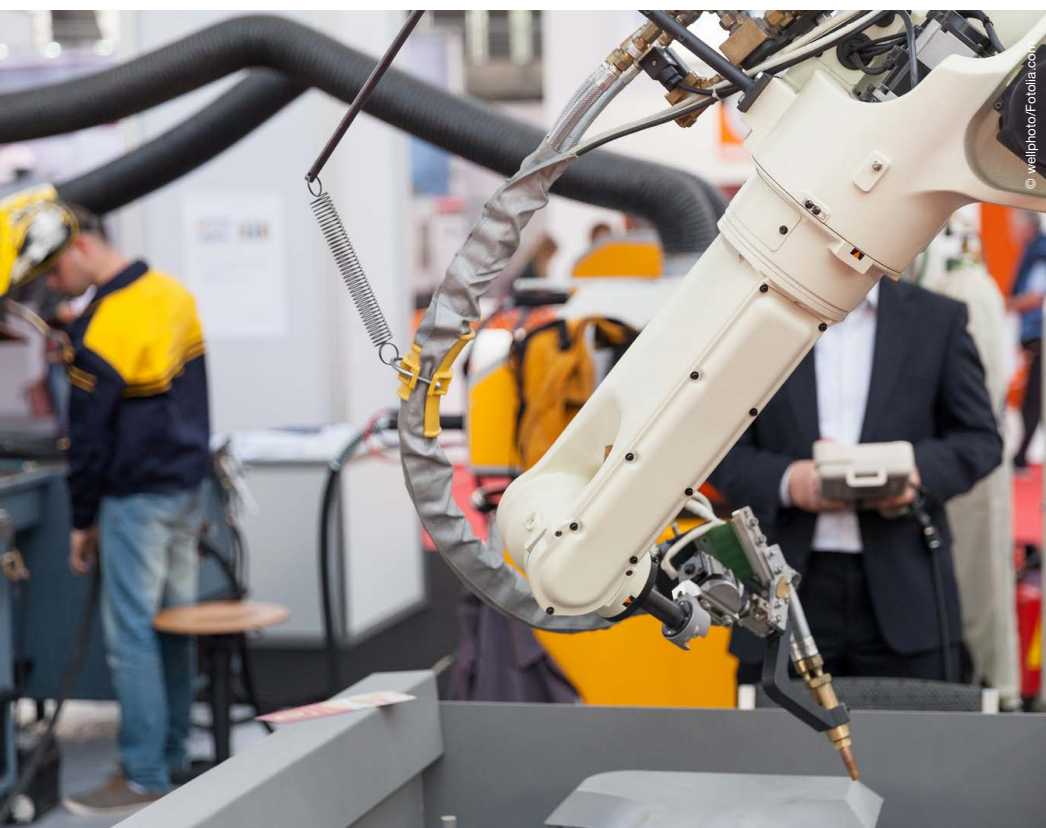
What should users pay attention to when selecting overcurrent protection?

Besides choosing the appropriate current rating for protecting the cable cross section used, there are two other important details. During the switch-on time, drives need a multiple of the current rating. This maximum current must not cause the selected protection element to nuisance trip.

During braking, drives basically behave like generators. They create a voltage which backwardly affects the entire system. Very high voltage peaks occur in the reversal moment which can load or even destroy electronic components. Therefore defining the maximum dielectric strength is very important when using electronic fuses.

The right protection

The **ESX10-TC-101-DC48V** (DC18V... DC60V) electronic circuit protector allows accurate protection of DC 48 V drives. The **ESX10-TC** is available in fixed current rating from 1 A to 16 A and protects a range of cable cross sections. Besides DC 48 V rated voltage, the ESX10-TC also covers DC 24 V and DC 36 V voltage



range – allowing the user to operate three voltage ranges with a single device.

The trip time is typically 1.2 times rated current and ensures overload protection. In addition, active current limitation allows connection of high inrush currents. The circuit protector is fitted with semi-conductors which allow a maximum drain-source voltage of 100 V. Therefore, it can withstand return voltages of up to DC 63 V. So, the **ESX10-TC's** robust design reduces machine downtimes at maximum performance levels and ensures faultless operation.



Your benefits

- Efficient cable protection in current ratings from 1 A to 16 A
- Simplified logistics through three voltage ranges in a single device: DC 24 V, DC 36 V and DC 48 V
- Switch-on of high inrush currents with active linear current limitation
- Extremely robust and reverse voltage protected up to DC 63 V
- UL508 listed approval

Specifically designed for protecting power trains and their control technology: the **ESX10-TC-101-DC48V** electronic circuit protector





3120 thermal circuit breaker with IP65 protection degree

■ This breaker won't leave you out in the rain

E-T-A offers a brand new circuit breaker/switch combination for snap-in mounting. It is ideal for applications requiring high IP protection degree.

One of the primary goals of design engineers today is to systematically reduce components. This is one of the keys to an economic design. In addition, less components also allows engineers to save internal space resulting in more compact products. To help design engineers reduce components, E-T-A offers circuit breaker/switch combinations. These are overcurrent circuit breakers which also serve as the ON/OFF switch for equipment, machinery or systems. They also significantly reduce mounting and wiring efforts.

The flagship of this product group is E-T-A's 3120, proven a million times over worldwide. It is a single or double pole thermal or thermal-magnetic circuit breaker. After tripping due to

overcurrent, the 3120 can easily, reliably and quickly be reset. Time-consuming fuse replacement is eliminated.

Circuit breaker/switch combination with high IP rating and snap-in mounting

Equipment is often used in environments that are not clean and dry (e.g. medical equipment, food processing, professional tools). This requires machinery and apparatus manufacturers to design equipment with a high IP protection class. The higher the degree of protection, the more efficiently dust and water ingress is prevented. The details of these protection degrees are defined in the EN/IEC 60529 standard.

For mounting a circuit breaker/switch combination, most customers prefer easy

and quick snap-in mounting. Until now, IP rated circuit breakers only referred to the protection degree of the circuit breaker itself. Sealing of the rocker actuator was done with a PVC splash cover with an IP54 protection rating. The customer was then responsible for ensuring sufficient protection between the circuit breaker and the mounting hole.

3120 with innovative accordion-style seal (IP65)

E-T-A listened very carefully to its customers and developed the 3120 circuit breaker with a new accordion-style seal. This new design effectively protects the rocker actuator, but also the mounting hole thanks to the 3120's integral rubber lip. The seal is made of silicone and provides a higher degree of protection: IP65. Even fine dust or water



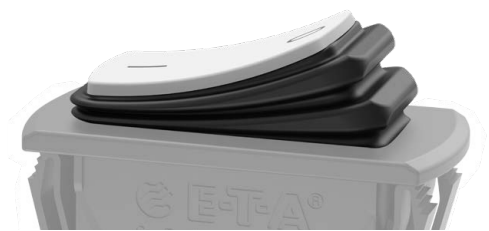
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jets will not damage the machine or cause downtime. E-T-A guarantees this impermeability. The customer no longer has to take care of it.

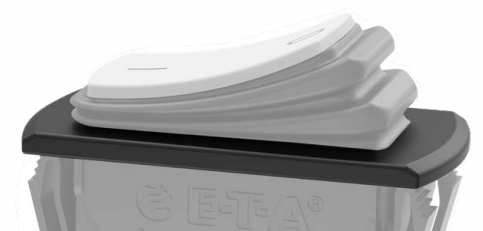
Easy actuation and environmentally friendly material

The new 3120 seal makes the rocker easy to access, it is no longer surrounded by an additional protective cover. Switching

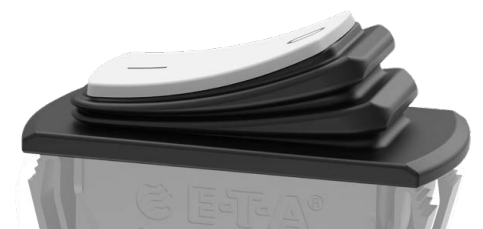
the device is simple, even when the user is wearing gloves. In addition, the switching status (ON or OFF) is clearly visible. The new seal is made of environmentally friendly silicone. It does not contain any noxious plasticisers and is very flexible no matter the temperature: Switching operations at low temperatures are as easy as those at normal ambient temperatures.



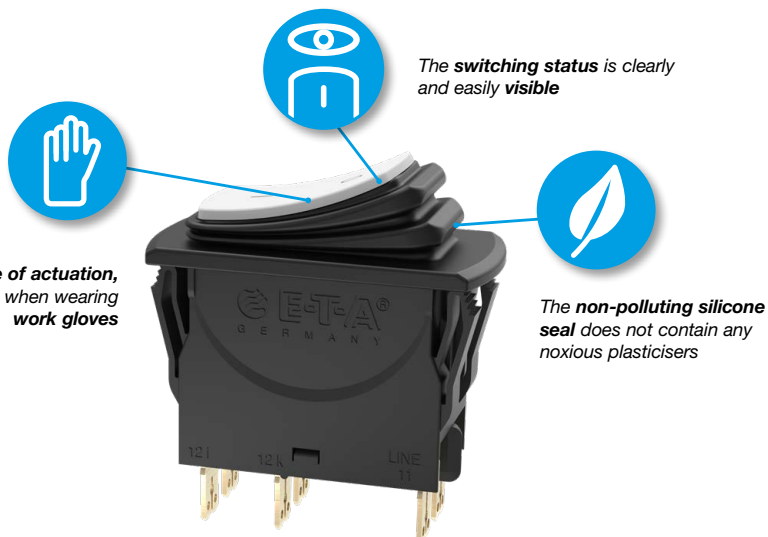
The **innovative accordion-style seal** protects the rocker against dust and water ingress



The **all-round rubber lip** also protects the mounting cut-out



The **new silicone seal** is insensitive to ozone, ultraviolet light and most oils and acids.



Ease of actuation,
even when wearing
work gloves

The **switching status** is clearly
and easily **visible**

The **non-polluting silicone**
seal does not contain any
noxious plasticisers



Gerson Eisbrenner ist
Market Manager für Land-
und Baumaschinen bei E-T-A

What are the current trends in the construction and agricultural industry?

Construction machinery and agricultural vehicles digital and networked!

Gerson Eisbrenner, E-T-A's Market Manager for agricultural vehicles and construction machinery attends many meetings, trade shows and visits customer frequently. He has a wealth of knowledge about relevant and emerging technologies and trends in the agriculture and construction industry. We talked to him about current and future developments.

Current: What is the predominant trend you see in agricultural vehicles and construction equipment right now?

Gerson Eisbrenner: There is a clear shift towards using higher level assistance systems for quick and efficient resolution of tasks. A shortage of skilled labour and cost pressures is forcing our customers to design autonomous or remote controlled machines.

Current: What challenges does this create for vehicle and equipment manufacturers?

Gerson Eisbrenner: In the future, vehicles will have to independently recognise an existing problem and know how to resolve it efficiently. The more automation technology used in vehicles, the higher the electrical power needed to measure

and regulate. Decentralised co-ordination of all loads requires, among other things, standardised interfaces.

Current: What solutions does E-T-A offer to meet these requirements?

Gerson Eisbrenner: We offer both conventional switching and protection solutions as well as intelligent power distribution systems which we develop in co-operation with our customers. Our products combine high shock and vibration resistance for off-highway applications and the functionality needed to protect, switch and monitor on-board electrical systems in a compact and robust design. Our solutions are compatible with all standard CAN-capable control units and are designed for current ratings of 10 A or more.

Current: In your opinion, what will construction machinery and agricultural vehicles be like in 2030?

Gerson Eisbrenner: While large, powerful machines will still be driven by combustion engines, due to the high demand for energy and powered by alternative fuels, small to medium-sized vehicles will be completely electrified. Machinery of the future will have cognitive abilities, will constantly optimise tasks via algorithms and will ultimately make life easier for users.

Current: Thank you for your time.

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.*



Marc Untheim

In May 2018, Marc Untheim joined the Transportation Division as a Junior Business Field Manager. He completed his M.Sc. in Industrial Engineering at the FAU Erlangen-Nuremberg as well as at the SKKU in Seoul where he gained experience in Market Intelligence, Electric Mobility and Quality Management. It is Marc's goal to push market development in mobility and transportation and inspire E-T-A customers worldwide with customised solutions and products.



Thorsten Fertig Frank Hake

During a re-organisation of the European sales structure in 2018, Frank and Thorsten took over management of the German, Austrian and Swiss sales region.

Thorsten started as a Regional Sales Manager for E-T-A in Southern Bavaria in 2014 and since 2017 he was also responsible for the entire Southern Germany and Austrian sales region. Frank was the Regional Sales Manager for Northern Germany since 2016.

Together with their team, Thorsten and Frank will support E-T-A customers with innovative products - successfully placing E-T-A's innovations in the market.



FAQ

What are »high side« switches and «low side« switches?



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**

The increase in fully integrated semi-conductor switches requires users to understand the difference between two versions of switches:

- high side Schalter
- low side Schalter

They differ in the integral control which means they also differ in use and the connection required. These FAQs will help users select and wire of the two versions.

What is the circuit symbol of a solid state relay?

In practice, several circuit symbols are used.

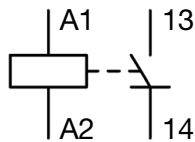


fig. 1.1-1

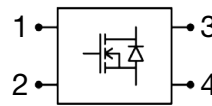


fig. 1.1-2

Fig. 1.1-1 to DIN 60617 shows a bidirectional relay in make contact configuration, in a »normally open« state. This means that contacts 13 and 14 are open in normal condition. Only a control input at contacts A1 and A2 will lead to a current flow via contacts 13 and 14. **Fig. 1.1-2** shows a traditional circuit symbol. The relay is activated at terminals 1 and 2. In addition, the circuit symbol indicates the technology used by the switching element at load terminals 3 and 4.

What does “bidirectional relay” mean?

A bidirectional relay can carry and switch current in both directions.

What is the difference between a solid state relay and a mechanical relay?

A solid-state relay does not have any electrical contacts and does not have electro-mechanical actuation. It has no moving parts that are prone to wear. Hence the expression “solid state relays”. The switching element is a power semi-conductor.

Does a solid state relay provide physical isolation?

An open load contact cannot ensure physical isolation. This must be taken into account especially for voltages higher than an acceptable touch voltage of 60 V.

What is the difference between the two versions for the user?

The two switch versions differ in the circuitry of the load circuit at contacts 13 and 14. High side or low side indicates the integration of the switch into the circuit in relation to the load. The following equivalent circuit illustrates the difference:

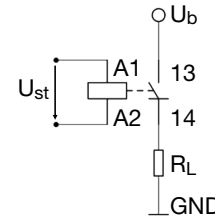


fig. 1.2-1

high side switch

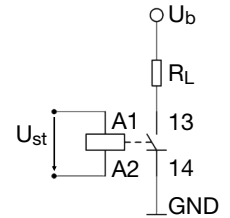


fig. 1.2-2

low side switch

U_b : operating voltage, GND : mass potential,

U_{st} : control voltage, R_L : load

Fig. 1.2-1 shows a high side circuitry. This means that the supply voltage U_b is connected with the load R_L via the load contacts 13 and 14 of the relay. It de-energises the load R_L as soon as the switch is open. **Caution!** A semi-conductor switch does not provide physical isolation between source and load.

With a low side circuitry as shown in **fig. 1.2-2**, however, the load contacts 13 and 14 of the relay are between the mass of the circuitry GND and the load R_L . Opening the contacts will not de-energise the load R_L .

Note: circuitry to protect the semi-conductor against overvoltages caused by switching actions should always be provided.

List of references

DIN-Deutsches Institut für Normung e. V., Berlin, 1996. DIN 60617-7 Grafische Symbole für Schaltpläne - Teil 7 Schaltzeichen für Schalt- und Schutzzeirrichtungen. Berlin: Beuth GmbH Verlag, Berlin, 1996.



Ricardo Pimenta,
Graduate Engineer and Technical
Business Economist,
Product Manager Transportation

Durable, robust design and high performance

A whole universe of relays

E-T-A offers a wide range of relays - tailored specifically to the requirements of automotive customers.

E-T-A's relays for automotive applications can help when off-the-shelf parts reach their limits. For example, the ESR10 micro relay is ideal for applications where mechanical automotive relays fail too soon. The mechanical and electronic power relays MPR10 and EPR10 also offer increased endurance, durability and performance.

E-T-A can help when it comes to meeting deadlines and overcoming existing design limits. E-T-A is significantly extending its relay portfolio beginning in April 2019 where a number of new relays will launch.

This will particularly enhance the timer relay product group. Today, customers can order the ETR10 in a multitude of

individually selected options, configurable according to their requirements on the E-T-A website. The new timer relays allow customers to reset the times directly on site during installation.

A group of special relays offer optimised solutions for a range of applications. Our website gives you an overview of the applications and the corresponding descriptions. These include, flasher relays, H-bridge relays for motor control or relays for voltage monitoring.

A completely new product category for E-T-A is its CAN-capable components. They include an automotive cubic relay and two modules with various inputs and outputs. These programmable products

offer E-T-A's customers a whole new world of solutions. Together with the HVR10 high voltage relay, which is already in development, E-T-A offers a wide range of relays from 10 A to 300 A and from DC 12 V to DC 900 V.

Multifunctional relays

Programmable relays for a range of applications without further communication capabilities



Solid state relays

Devices for switching on or off in various sizes, with different footprints and numbers of channels



Timer relays

Combination of a relay with a timer control element for ON and OFF delays



Special relays

Tailor-made relays for special applications



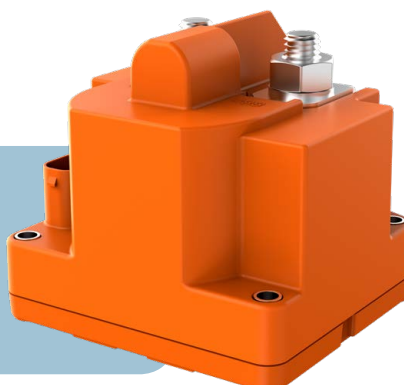
Power relays

Relays with current ratings higher than 70 A and a maximum operating voltage of DC 60 V



High voltage relays

Components for high voltage applications



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: 3120 and 1140-G

Getting rid of the dirt

Haaga Kehrsysteme GmbH manufactures manual sweepers. Their product range includes entry level models for private use as well as robust handheld sweepers for professional use, e.g. for cleaning parking lots, gas stations and garages. In their battery-powered sweepers, E-T-A's 3120 serves as the main ON/OFF switch. They also use E-T-A's resettable 1140-G model to protect the brush rollers against overload.

Unlike other sweeper manufacturers, Haaga uses their patented circular broom technology throughout their complete range. This innovative sweeping system has two counter-rotating circular brooms lifting the sweepings and transporting them directly into the container. The machine sweeps up the dirt lying directly in front. It does not roll over the dirt nor does it just push the sweepings around. Even wet leaves or soda cans are easily

swept off the ground. The 400 and 600 sweeper series have an additional brush roller for fine dust to complement the circular broom system.

With this system, the handheld sweepers offer a double sweeping operation and reliably pick up even fine dirt particles. For their battery-powered sweepers, Haaga relies on E-T-A's **3120** circuit breaker for equipment protection with rocker actuation. This robust E-T-A circuit breaker has a DC approval to the IEC/EN61058 standard and guarantees at least 50,000 operating cycles. In a customised sweeper for their customer Stihl, Haaga also uses E-T-A's **1140-G** thermal circuit breaker. In the event of a blocked brush roller, the **1140** reliably disconnects the supply voltage. Damages due to overheating on due to overloads are eliminated. When the cause of the blockage is resolved, the sweeper can easily and quickly be restarted with a "click".



E-T-A type: 1140-G



E-T-A type: 3120



E-T-A type: EBU10-T

■ UPS operation on the safe side

E-T-A is recognised as the world market leader of circuit breakers for equipment protection and circuit protectors. With its products protecting lives and values of its customers, they provide safety in many circumstances. Of course, E-T-A uses its own products in many places including its own production facilities. For instance the **EBU10-T**. It is the first and only electronic circuit breaker appropriate for the output protection of AC 230 V UPS applications on the market.

In E-T-A's headquarters in Altdorf, near Nuremberg in Germany, they use the **EBU10-T** to protect a UPS sub-distribution for the supply of UPS-supported power outlets. Computer work stations are protected with this installation. The goal is to maintain uninterrupted power supply for computers in the event of a power failure. Before, they

repeatedly experienced nuisance tripping with the previously used B6A MCBs. Only when using the **EBU10-T** were they able to change over to C16A devices. This group ensures start-up of the computers as well as selective tripping in the event of a failure (short circuit).

The **EBU10-T** makes planning much easier through its variable overcurrent protection and significantly reduces overall costs.



E-T-A type: EBU10-T



High Power-D-Box power distribution system protects memory system

Against oblivion - reliable supply of storage systems

Safety for high-end memory systems: **Hewlett Packard Enterprise (HPE)**, located in Palo Alto, California, manufactures servers, networks and storage products. Their high-end reliable products make HPE one of the leading global suppliers of information technology products.



*Providing reliable power supply and protection: **High Power-D-Box** with grounding busbar, **8345** circuit breakers and 3PAR cable set*

The **High Power-D-Box** power distribution system with E-T-A's 8345 hydraulic-magnetic circuit breakers provides reliable power supply and protection of direct current (DC) powered variants in »HPE 3PAR StoreServ 8000« Tier-1 flash storage systems.

The HPE 3PAR StoreServ 8000 Storage family delivers multi-petabyte scalability with accelerated performance of over 1 million IOPS, over 20 GB/s, and sub-millisecond latency for the most demanding and mission critical applications across industries.

In addition to the power distribution system, E-T-A also manufactures the cable

sets connecting the storage systems to the High Power-D-Box as well as the centralised equipotential bonding busbars for grounding all loads in the server cabinet.

E-T-A works directly with HPE as a system and solution partner on this "one-stop-shop" concept, which makes server cabinet installation significantly easier because of the perfectly matched components which actually creates true added value for HPE.

Currently E-T-A power distribution systems are delivered worldwide from the HPE integration center in Kutná Hora. Kutná Hora is located in the Czech Republic, 75 km outside of Prague.



*The storage system HPE 3PAR StoreServ 8000 is reliably protected and powered by the **Power-D-Box**.*

CULINARY DELIGHTS

Typically Czech:

»Lívance or Czech pancakes – a sweet temptation«

Lívance are leavened Czech pancakes. They are very popular in the Czech Republic and can be cooked as a main dish, maybe with a soup as a starter, or as an - admittedly very rich - dessert.

Instructions

Mix flour with instant yeast in a mixing bowl, add a pinch of salt and 1 tbsp of sugar. Add luke-warm milk and eggs and stir well. The consistency of the batter should be pasty. Let the batter rise, covered, until it doubles in size – usually about an hour.

Melt the butter oil to be used for frying in a small pot. If available, heat up a special pan for lívance with five or more dents. You could also use a crumpet pan if you have one. Brush the dents with the butter oil and pour a small ladle of batter into each dent. Fry the pancakes at medium heat until both sides are nicely browned, take them out and keep warm. Repeat this process as required to use up the batter.

Serve the pancakes while hot, sprinkled with cinnamon sugar or plum butter (povidla) or heat some sugar beet syrup

mixed with butter and smother it on your lívance – there's nothing better!

Preparation time:

Approx. 30 minutes (without waiting time)

Ingredients for 4 servings:

- 500 g flour
- 2 eggs
- approx. ½ l milk
- 1 pinch of salt
- 1 tbsp sugar
- 1 sachet instant yeast

Plus:

- sugared cinnamon or ground poppy seed, povidla, sugar beet syrup with butter





CPC20 ControlPlex® System Intelligent DC 24 V protection

Ready for industry 4.0

The intelligent **CPC20 ControlPlex®** System protects your DC 24 V power distribution against overload and short circuit.

- **Maximises your system availability** – through comprehensive diagnostic functions
- **Increases protection against voltage dips** – through selective protection of the loads
- **Enhances flexibility of your plant design** – through a modular terminal block system

Talk to us! We look forward to getting in touch.
www.e-t-a.de/cude1-19



ENGINEERING TECHNOLOGY

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