

Reliably switching high currents

Solid State Smart Power Relay SPR10-T
for DC 12 V and DC 24 V applications

We are overcurrent protection

Why you should trust experts on such an important subject

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Voltage on the rise

On the trail of a megatrend in many industries: 48 V

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Reliable short circuit trip even with long cable lengths?

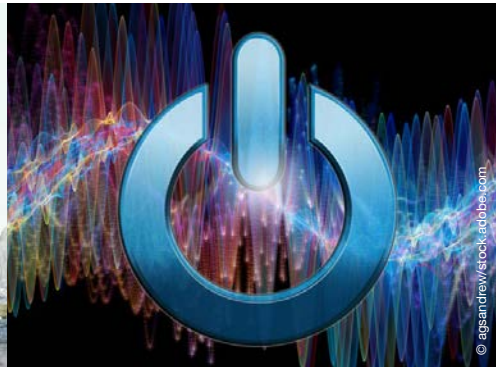
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■ We are overcurrent protection

Why you should trust experts on such an important subject

Overcurrent protection is a matter of trust – no matter what market you are in. Professional overcurrent protection does not allow for experiments. We are the world market leader in overcurrent protection and can offer you versatile service that is second-to-none.

Our major goal is to tailor the protection precisely to your application. You can count on it: no matter what functional principle, design and configuration makes sense for your product, you will find it in our comprehensive portfolio.

But this is only the beginning. We can fine-tune our overcurrent protection for individual components even more specifically to your requirements. At the same time, our product specialists can support you with their deep market knowledge and find individual and custom-built solutions together with you.

This gives you the opportunity to completely concentrate on your product – always knowing in the back of your mind: E-T-A is overcurrent protection.

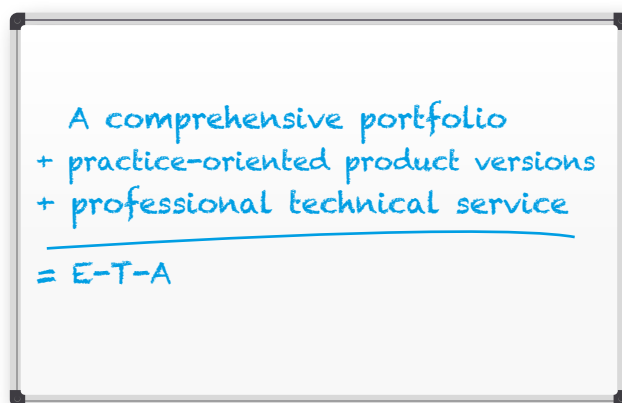
What can we do for you and your products? Please get in touch. Or do you have a certain project you wish to discuss with us? **We look forward to speaking with you.**



Dr. Jennifer Sell

Director of

E-T-A Elektrotechnische Apparate GmbH



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

On the trail of a megatrend in many industries - 48 V

Voltage on the rise

E-T-A's circuit breakers, relays, control units and systems are successful in a diverse group of industrial branches. Often products, solutions and knowhow used in industries such as utility vehicle production, aerospace or machine construction are also suitable for other markets.

This approach allows E-T-A to offer products for the 48 V megatrend not only for trucks and passenger cars, but also for machine and panel builders.

A major reason for the DC 48 V megatrend in all types of vehicles is the reduction of CO₂ produced by road traffic. Even heavy trucks and buses will soon be subjected to stricter legal regulations. Newly registered trucks must emit 15 % less CO₂ from 2025 on and in 2030 30 % less compared to 2019. In order to reach these goals, the vehicles must become much more efficient. This is not possible with the DC 12 V or DC 24 V technology used today. It significantly increases efficiency and correspondingly reduces CO₂ emissions if braking energy is not simply used to

increase brake disc temperature, but is stored in a DC 48 V battery. This energy source will then feed an electric motor that supports starting. The higher voltage also helps reduce weight, since design engineers can reduce the cable cross sections of the copper cables.

E-T-A supports this trend with suitable products. One of them is the **1170** thermal circuit breaker which is able to protect DC 48 V loads. Unlike blade fuses, it can quickly be reset. The **MPR10** mechanical power relay also has an enhanced version that can switch 300 A at DC 48 V. If there are special applications where we cannot offer a suitable product yet, we will try to find a solution through a design partnership. We prepare concepts such as the **EPR10**

electronic power relay whose operating voltage can also be increased from DC 24 V to DC 48 V (160 A).

In mechanical engineering and intralogistics, modern drive systems such as DC motors, multiphase motors, servomotors and completely new applications such as autonomous, driverless goods transport and storage systems demand more power. Increasing the operating voltage from DC 24 V to DC 48 V allows the use of more powerful and compact loads without having to increase the conductive cross sections in cables, terminals or loads. The DC 48 V technology is specified in a way to ensure that the critical limit of 60 V will not be exceeded, not even under unfavourable circumstances. This is important, because otherwise



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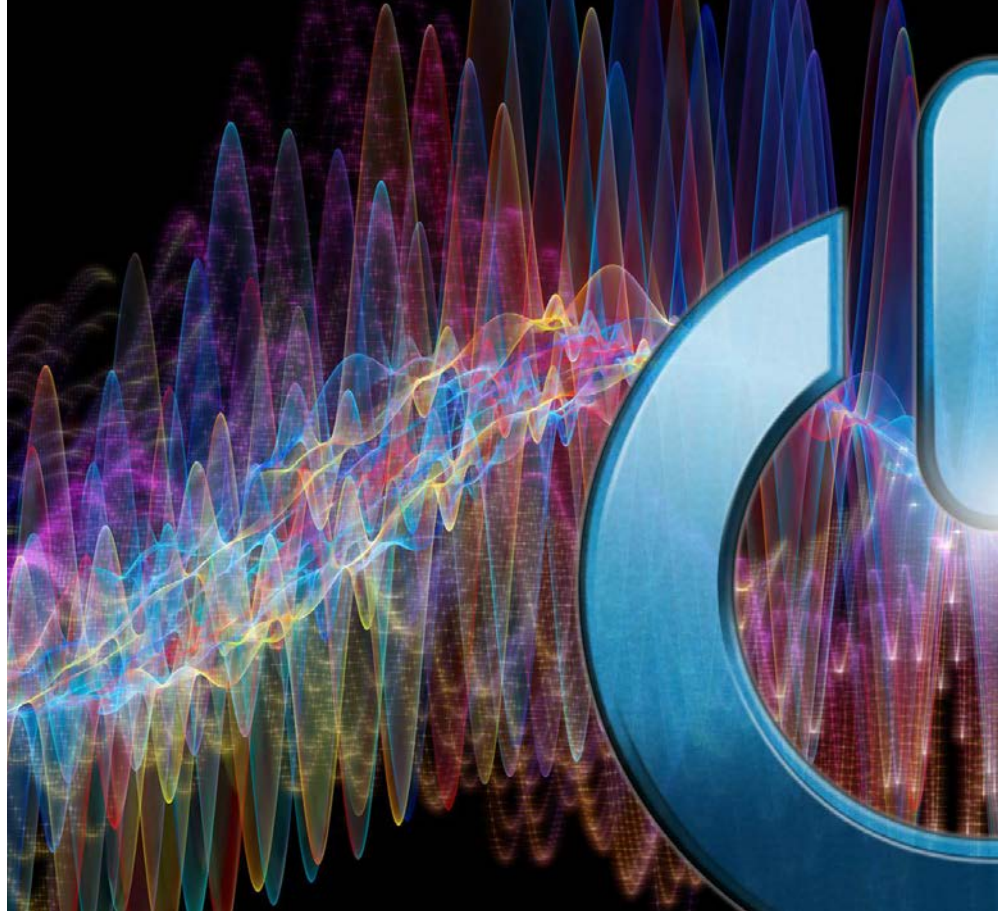
significantly stricter requirements apply both for the operators and the equipment or vehicle.

The **ESX10-T** electronic circuit protector is ideal for these applications. It unites well-proven rail mounting for

DC 24 V industrial components with a powerful DC 48 V semi-conductor technology including an active, linear current limitation. The precise detection of short circuit and overload increases transparency, reduces trouble-shooting and boosts productivity.

It is such a cross-industry approach that allows E-T-A to go one step further. Go with us!





SPR10-T Smart Power Relay for DC 12 V and DC 24 V applications

Switching High Currents

In many automation applications, car production, utility vehicles and in the steel industry, powerful loads do not only have to be switched on and off quickly, they must also be protected. The new **SPR10-T** will switch powerful loads and protect them against overcurrents.

Three functions in one unit

The **SPR10-T** extends E-T-A's solid state remote power controller product portfolio and is appropriate for DC 12 V and DC 24 V applications. Unlike conventional relays, the SPR10-T provides overcurrent protection as an integral feature. In the event of an overload or short circuit, the electronic overcurrent protection intervenes and reliably disconnects the faulty path at more than 1.3 times rated current within 30 ms. All other circuits remain unaffected, ensuring effective trouble-shooting and increasing machine uptime and system availability.

In addition, the **SPR10-T** has an in-built fuse which serves as a back-up solution for the electronic overcurrent protection function in a worst-case scenario by

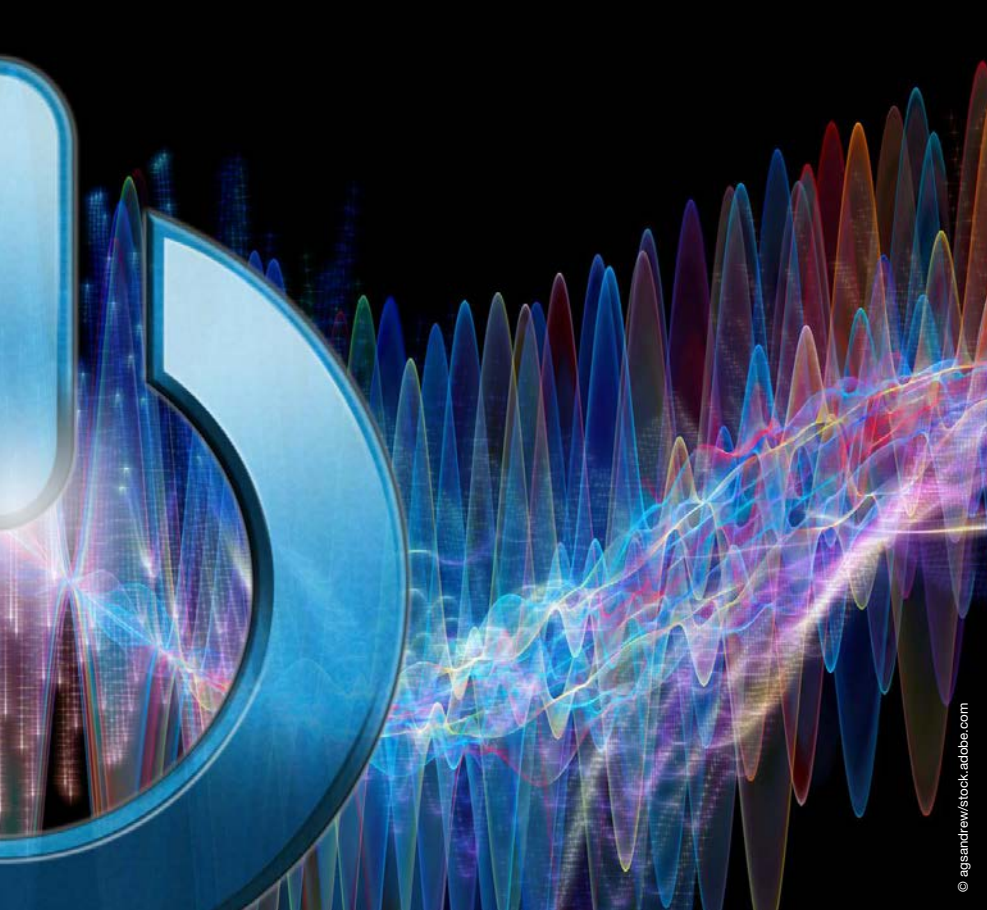
physically isolating of the load circuit. Thus, all loads are reliably protected even in the event of extreme overcurrents. The trip is indicated directly on the device as well as via a status output. In multi-channel applications, the signal can either be evaluated as a single signal or also as a group signal.

Afterwards, the **SPR10-T** can be reset via the control input - control voltage between 8.5 V and 32 V = load output connected, control voltage < 5 V = load output blocked. ON delay is only 1.5 ms both with an intentional ON or OFF operation and with a reset. As a result, applications requiring relay functionality will not only reduce the additional components required for overcurrent protection, but also improve machine and system availability.

High performance in a restricted installation space

SPR10-T has current ratings of 20A and 25A making it the ideal solution for powerful loads with high current demands in the DC 12 V and DC 24 V applications. Despite its slim profile, of only 12.5 mm width, it accommodates cable cross sections up to 10 mm² both for power input (UB), load output (L+) and load return (0V). Thanks to the integral power distribution and the available busbars, the **SPR10-T** can be used as a miniaturised power distribution system and as a fringe benefit, wiring efforts are reduced to a minimum.

Direct rail mounting allows flexible and quick set-up that can be specified exactly to the customer's application. This helps



save time and costs and at the same time creates a clearly organised control cabinet. With a width of only 12.5 mm, this combination of properties makes the **SPR10-T** an efficient and compact solution many applications.

At a glance: SPR10-T Smart Protection Relay

- Solid state relay with control input (ON delay 1.5ms)
- Electronic overcurrent protection (trip at 1.3 x IN)
- Signalisation function and power distribution



SPR10-T Smart Power Relay

The combination of these properties is, with a width of only 12.5 mm, an efficient and compact solution for your application.





Tobias Jessberger,
Director of
JESSBERGER GmbH



3120 circuit breaker in barrel pumps made by **Jessberger**

■ Reliable pump protection

JESSBERGER GmbH, located in Ottobrunn near Munich, is a family-owned business, producing drum pumps and submersible pumps as well as hand pumps for thin liquids and specialised screw pumps for highly viscous liquids. For some years now, filling systems are also part of their product range. The Current talked to Managing Director Tobias Jessberger about using E-T-A's circuit breakers.

Current: What are typical applications for Jessberger pumps?

Tobias Jessberger: Our pumps are used in nearly every industrial area for pumping chemicals, mineral oil products, foodstuffs and even flammable media. Currently we are exporting our products into more than 70 countries all over the world. I am the owner of the company and I always find it interesting to see where our pumps are used. Recently we had an enquiry from a fruit juice manufacturer in Greenland and a few days ago, a major chemical factory in Vietnam got in touch with us and they already use more than 30 of our drum pumps.

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

Tobias Jessberger: My father has worked in the industry for more than 50

years. Therefore, we have known E-T-A as a reliable supplier of circuit breakers for equipment protection for many decades. We exhibit at 10 to 15 trade shows in Germany every year and are in regular contact with your employees. This is why, in the past few years, our Design Engineers have immediately involved E-T-A in the design phase for new product developments.

Current: What E-T-A circuit breakers do you use and what is their function in the application?

Tobias Jessberger: For many years, we have used various E-T-A circuit breakers in our drum pump motors. Besides a compact design and reliable performance, they have short lead times and a very good price-performance-ratio. One of the breakers we use is the 3120 circuit breaker with integral overcurrent

protection. E-T-A's overcurrent circuit breaker protects our drives and thus in the end they also serve the users of our pumps.

Current: Are there special requirements that your pumps, and equally our circuit breakers, must meet?

Tobias Jessberger: Due to the fact that our drum pumps are sometimes used in very aggressive environments and, moreover, are used for conveying flammable media with a burning point below 55°C in Ex zones 1 or 2, all our drum pump motors and all the components including the installed switches, must comply with the highest safety standards and currently valid regulations. E-T-A has our full confidence on this subject.

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.*



Nick LaRoche

In March 2019, Nick LaRoche joined the WSV division in the US as a Strategic Account Manager. Nick has a business degree in Marketing from Illinois State University. Prior to E-T-A, he held various sales and marketing positions within the electrical industry with a focus on lighting control and building automation. Nick has worked through various channels of OEMs, Independent Representatives and Distributors. His focus will be to build brand awareness of **PowerPlex®** solutions and create new business within the Marine and RV industry.



Wei Cjong Lim (CJ)

WEI CJONG LIM (CJ) joined E-T-A's Singapore subsidiary in September 2018. He will assist South-East Asia and Korea in pre-sales and post-sales support. In order to ensure customer satisfaction for E-T-A products, solutions and services, CJ will work closely with the sales teams and operation teams to provide his expertise and skills to the region focusing on Automation Process & Control, Equipment and Transportation.



Albert Sixt

At the end of 2018, Albert Sixt joined the E-T-A sales force in a newly created job as a Market Manager for **PowerPlex®** products and is responsible for customers in the mobile homes and boating sector. Together with our customers, he finds individual solutions that offer a competitive edge as well as cost savings in distribution, control and monitoring of the on-board electrical system. Albert brings a wealth of experience to the job and also a love for motorhomes.



FAQ

»Relays for motor vehicles and how to control them«

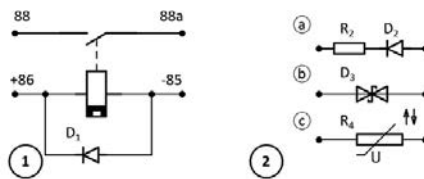


Our FAQ column discusses topical and practical subjects to support you in your daily work. Do you have any questions you need answer to? Send it to us – we are looking forward to hearing from you. **E-Mail: faq@e-t-a.de**

In motor vehicles, high power relays carry and switch high load currents. Depending on the type of drive and the load contacts, we can distinguish these relays. We will answer frequently asked questions about drive and configuration to make it as easy as possible to install and replace these devices.

How to control a relay?

The IEC 60617-7 standard defines the electronic symbols of the devices. The terminal numbers marking is specified in the DIN 72552 for automobile electrical terminal numbers. Relays have an electromagnetic drive. Fig.1-1 shows the electronic symbol for a relay with N/O configuration. The electronic symbol for the relay's drive indicates that the drive must be controlled with a specified polarity.



Pin denomination as per DIN 72552:

88: Input make contact 88a: 1 output make contact
+86: Input drive -85: Output drive

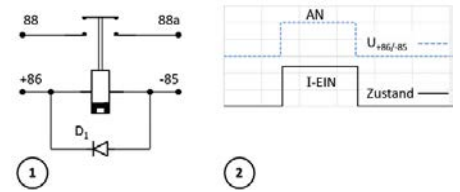
fig. 1: Electronic symbol and switching status diagram - monostable relay

The D1 free-wheeling diode protects circuitry and must be provided by the user. Other safety circuits such as R2 free-wheeling with diode D2, TVS diode D3 and varistor R4 are shown in fig. 1-2-a to fig. 1-2-c.

What does monostable and bistable mean?

We distinguish electro-mechanical relays based on its drive. We explain the function of a **monostable power relay** and a **bistable power relay** below.

Monostable relays are switchgear which only have one rest position. Fig. 2-1 shows the electronic symbol for a monostable relay with N/O configuration with double contact system. Fig. 2-2 shows a simplified switching status diagram.



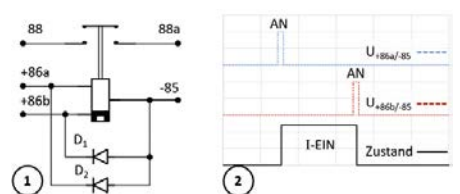
Pin denomination as per DIN 72552:

88: Input make contact 88a: 1 output make contact
+86: Input drive -85: Output drive

fig. 2: Electronic symbol and switching status diagram - monostable relay

The drive of the relay must be permanently activated with a voltage $U_{+86/-85}$ applied to the terminals of the operating coil so that the relay changes and keeps its switching status. The device is in the ON condition and the contacts are closed. If the operating coil is switched dead-voltage, the switching device will go into its rest position. The device is in the OFF condition and the contacts are open.

Bistable relays have more than one rest position. Fig. 3-1 and fig. 3-2 show the electronic symbol and the switching status diagram of a bistable relay in N/O configuration.



Pin denomination as per DIN 72552:

88: Input make contact
88a: 1 output make contact
+86a: Beginning of winding / 1. winding
85: Output drive
+86b: Winding tap / 2. winding

fig. 3: Electronic symbol and switching status diagram - bistable relay

After applying a control voltage pulse $U_{+86a/-85}$ to the operating coil, the relay keeps its switching status ON. Only when applying a second voltage pulse $U_{+86b/-85}$, the devices returns to the OFF condition.



Dieter Arenz, Graduate Engineer
Application Specialist
Communication & Systems Division

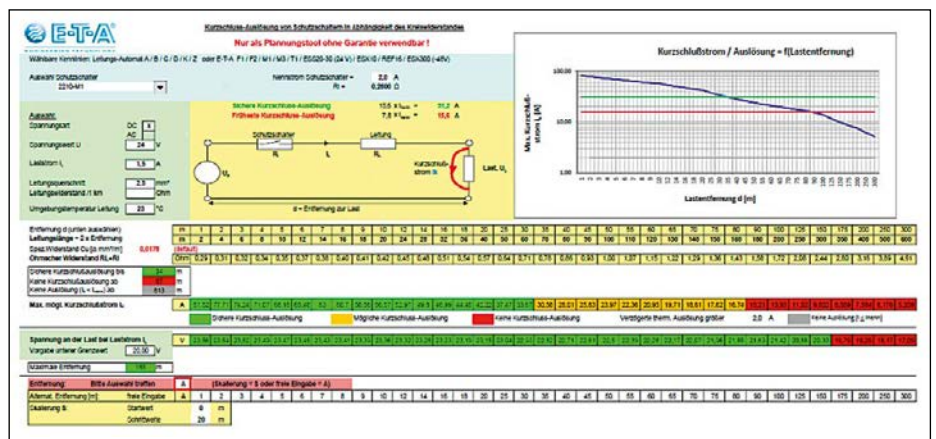
Planning tool for optimal protection in plants of the chemical industry

Reliable short circuit trip even with long cable lengths?

Long cables are very typical in many chemical and pharmaceutical plants where they connect protective elements and loads, often with a small cross section. In addition, there is the low supply voltage of only 24 V in the DC range.

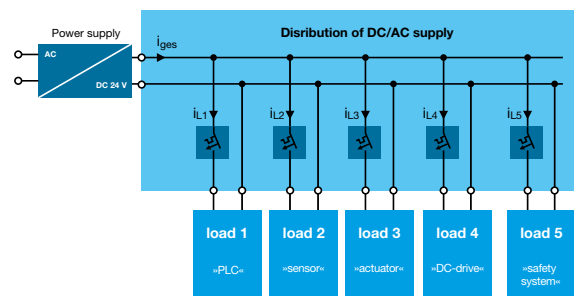
However, the MCBs used (thermal-magnetic) require up to 15 times rated current for a quick magnetic short circuit trip – this amounts to no less than 90 A with a C6 MCB. Such high current may not flow in the existing cables since their resistance is too high. And so there will not be a short circuit trip.

To assist in planning these plants, E-T-A offers the »Chemistry Tool«. With this excel spreadsheet, it is very easy to simulate at what cable length a fast-magnetic short circuit trip is guaranteed or if only a delayed thermal overload disconnection will take place. It is possible to enter cable cross sections, supply voltage and ambient temperature values. A range of protective elements such as MCBs, thermal-magnetic circuit breakers for equipment protection or electronic circuit breakers with different trip curves and current ratings can be selected from a list and immediately provide information about the expected function.



View of work surface of the »Chemistry Tool«

A multi-coloured chart shows the tripping thresholds depending on the cable length so that you can see at once which cable length the trip operation will be achieved. The effects are immediately visible when the cable and circuit breaker parameters are changed. An additional table shows the related exact and individual numerical values.



Schematic diagram of a typical DC 24 V power distribution

It is also possible to check availability of the selected protective elements and if undesired effects, such as nuisance tripping upon start-up of capacitive loads, can occur.

Link the free of charge download of the »Chemistry Tool«:
www.e-t-a.de/tool_chemie_e

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 type: Control cabinet

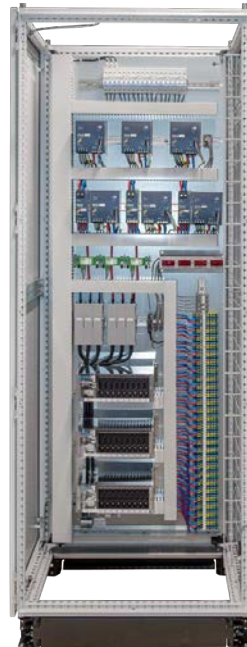
Everything included

Since 1889, **Evonik Industries** in Essen has operated the city's largest industrial chemical plant, which employs approximately 1700 employees on 32 hectares of land.

Today the company produces raw materials, auxiliaries, additives and active ingredients for skin and hair care products, detergents and cleaning agents, car care products, plastics, rubber, paints and varnishes, labels and adhesive tapes. In addition, they produce polyurethane foams for insulation, furniture, mattresses and the automotive industry.

State-of-the-art production facilities, research, development and application technology as well as marketing, sales and administration are all located

here. A new 24 V DC **power distribution cabinet** creates a power source that provides the system with a constant output of up to 200 A with 6 redundant 40 A power supply units combined via decoupling diodes. The total power is transmitted in a protected way via three 9-way distributors for the plug-in **type 8345** high-current circuit-breakers to the downstream sub-distribution boards and loads. Current measurement, power supply failure monitoring and switch signalling are integrated.



E-T-A type: Control cabinet



E-T-A type: REX12 system

■ Tubes, tubes, tubes

A.M.I. Automazione Meccanica Industriale was founded 40 years ago and specialises in tube processing by designing and optimising tubes for a range of applications.

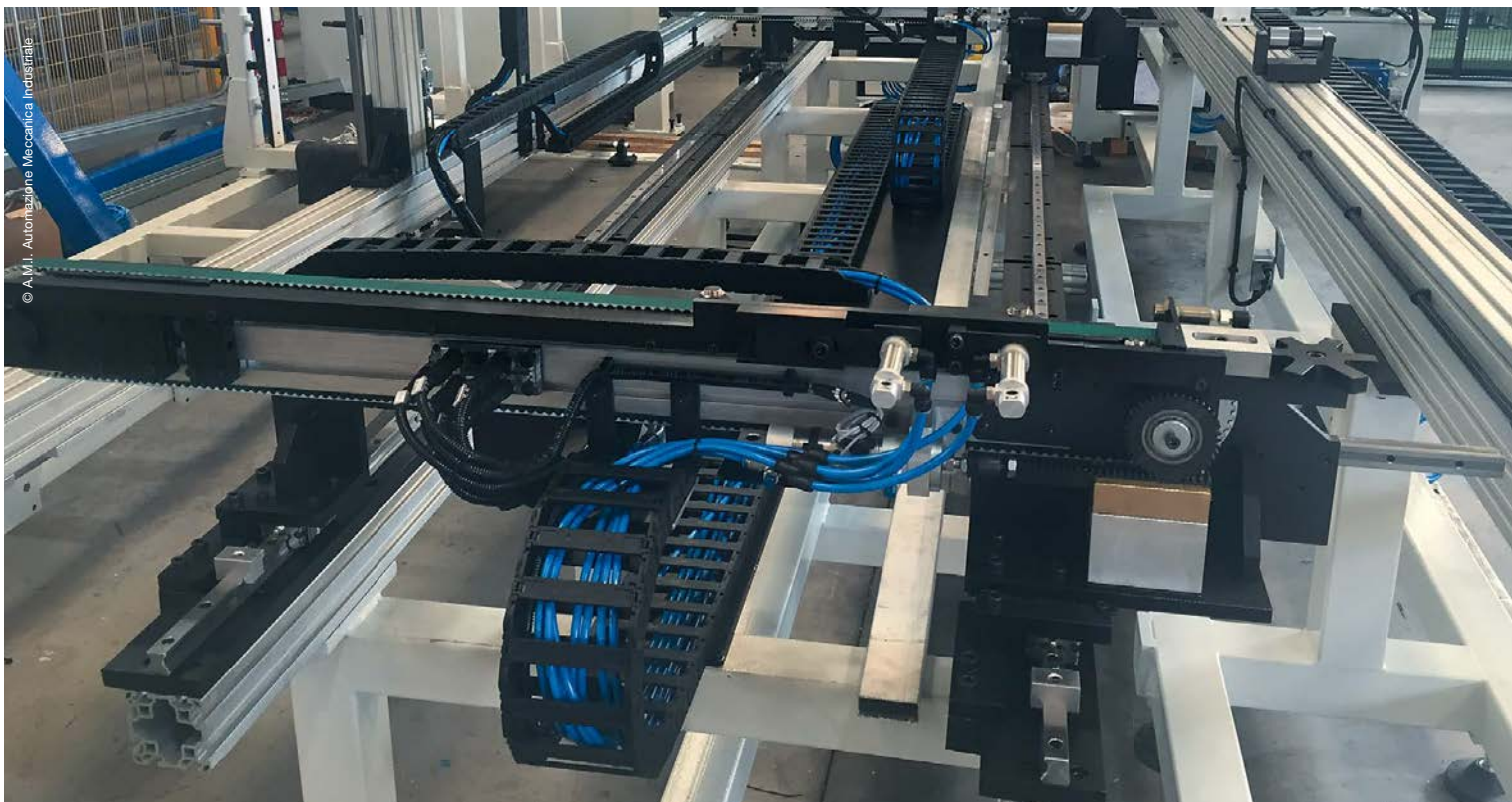
A.M.I. unites all critical production phases to develop electric, hydraulic or pneumatic systems. This includes machining with state-of-the-art machining centres and heavy duty boring machines to machine heavy structure all made through CAD-CAM process. It also assembles and tests the systems and, does tune ups for the final testing of the system.

A.M.I. chose E-T-A's **REX12 system** because of its convenient flexibility which perfectly fits with automation and the framework of their machines. All DC 24 V lines in

the field level are fed and protected with **REX12** electronic circuit protectors and the related **PM** and **EM** modular terminal blocks. Fast wiring time, space saving and a considerable cost saving, especially for power supplies, are the winning keys of the **REX12** "all-in-one" solution.



E-T-A typ: REX12 system



E-T-A's **REX12D-T** protects plants and system in the foodstuffs industry

Reliable protection

Reliably protecting DC 24 V systems and equipment is an important subject in the foodstuffs industry.



Poultry processing machine of Meyn Food

Meyn Food Processing Technology, a Dutch company, is a world market leader in producing poultry processing machines and systems. Anybody knows this industry requires the highest hygienic standards so all processing equipment must work reliably with practically no downtimes.

Meyn had the special requirement that not only the DC 24 V systems should reliably be protected, but that all channels should constantly be monitored by a bus-based system. Meyn knows its customers' requirements very well and did not want to make any compromises when selecting the protective elements: They chose the **REX12D-T** electronic circuit protector with IO link.

The **REX12D-T** was specially designed for plants and machinery making it the perfect solution for these applications.



REX12D-T Electronic Circuit Protector with IO link

IO-Link

The **REX12D-T** circuit protector allows customers to design an economical and reliable DC 24 V protection system with a side-by-side mounting design, requiring only minimal wiring efforts and no additional connection accessories. It consolidates three advantages into a single device:

- It saves costs and time
- It simplifies installation and replacement
- It can be individually adjusted to the application.

Technical and customer support works excellently thanks to E-T-A's Benelux subsidiary. Meyn is highly satisfied with the co-operation with our local subsidiary as well as our customer service team in Altdorf.

CULINARY DELIGHTS

Typically Dutch:

»Kale stew with smoked meat sausage«

*This dish is called **Boerenkoolstamppot met Rookworst** in the Netherlands. It is a typical hearty Dutch dish and is often eaten with the classic Rookworst, a smoked meat sausage.*

Stamppot is a mixture of mashed potatoes and vegetables. Often kale is used (Dutch: Boerenkool, literally “farmer’s kale”), alternatively carrots or sauerkraut also taste fine in this dish.

Directions:

1. Wash and peel the potatoes and cut into bite-size cubes. Wash and cut kale.
2. In a pot bring approx. 4 cm of water to the boil and cook the potatoes for 15 minutes. Put the kale into the potatoes and finally put the rookworst on top. Simmer for another 15 - 10 minutes.
3. In the meantime, fry the bacon in a pan.
4. Remove rookworst from the pot and keep warm
5. Drain the potatoes carefully with the kale and mash in a pot with a potato masher.

6. Add the butter and stir. Stir in boiled milk - the more milk, the creamier.
7. Add bacon and season with salt, pepper and a little vinegar.
8. Put stew onto plates and serve with rookworst.

This stamppot is an excellent meal in the winter! **Enjoy!**

Prep time: approx. 40 minutes.

Ingredients for 4 servings:

- 1.5 kg flouy potatoes
- 600 g cut kale
- 125 g bacon
- 30 g butter
- 100 -125 ml boiled milk
- 2 HEMA rookworst à 275 g (via hollandproducten.com)
- 1 - 2 tbsp vinegar
- salt and pepper





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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/cu_e3-19



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