



## A neat and smart connection

Circuit protector REX12-T provides economic and adaptive DC 24 V protection

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### Impressum

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Elektrotechnische Apparate GmbH

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# ■ The perfect fit

## Scalable solutions prove to be extremely economical in practice.

Imagine you are looking for power distribution systems and protection solutions - you are in for some exciting discoveries during your research. There will be interesting discussions, suddenly pushing your exact requirements to the back burner. There may be discussions where your project will be modified to fit your supplier's capabilities instead the other way around. Have you been in this situation before?

E-T-A handles scenarios like this in a very different way. It is our goal to take your requirements seriously and to design the best and most appropriate solution with you and for you. The key words here are "modularity" and "scalability".

E-T-A has specialized in the goal-oriented realisation of our customers' wishes for more than six decades. Based on our scalable product range we are able to economically and reasonably satisfy very specific requirements. E-T-A can also offer you the exact solution you require with a modular system. We consider this a major, forward thinking design approach.

For example, E-T-A's power distribution systems and electronic circuit protectors allow you to select the exact number of channels based on your system. You do not have to buy more than necessary. At the same time, you have the opportunity to expand your system when your requirements grow and change. This is not only true for automation technology, but for nearly all industrial branches relying on E-T-A's products.

Are you working on a project that might require our support?

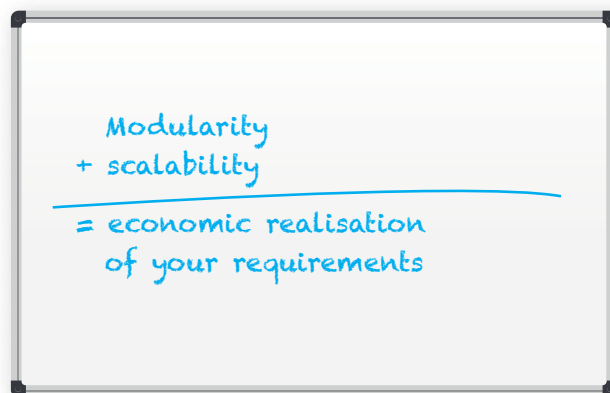
**Talk to us! We look forward to speaking with you.**



*Dr. Clifford Sell*

*Executive Committee*

*E-T-A Elektrotechnische Apparate GmbH*



*Our equation for tailor-made solutions,  
exactly meeting your requirements*

Module 18plus DC 24 V power distribution system and ESS30-S electronic circuit protector

## A nice couple

Modular power distribution with integral wiring and overcurrent protection meets electronic circuit protector ("Low Energy Breaker") with physical isolation



The flexible power distribution system **Module 18plus** offers DC 24 V potential distribution for plug-in type circuit breakers

### Flexibility in all aspects

E-T-A's **module 18plus** is most effectively used in wiring DC 24 V load circuits in decentralised power distribution systems and centralised control cabinets. It accommodates the **ESX10-S**, **ESX10** or the **2210-S** plug-in type circuit protectors and is a complete assembly system as well as a full-fledged **80A** DC 24V power distribution system. All connection terminals and internal connection lines come pre-integrated.

The **18plus**, with its terminal block elements and a width of only **13 mm**, offers flexible installation directly on the top-hat rail.

### Push-in makes your life easy

All electrical leads can simply be plugged into the **push-in terminals** - no tools required. This means: Reliable connections and maximum strength through high pull-out forces.

A reliable connection: in the event of shock and vibration and a gas-proof electrical connection make the system **maintenance-free**. Coloured pushers in red, blue, orange and grey show the different voltage potentials for conductor, return conductor, functional earth and auxiliary circuit. UL 1059 and IEC/EN 60950-1 **international approvals** open the doors to control cabinet building everywhere in the world.

### The three basic elements of 18plus

- **Supply module 18plus-EM** with a 16 mm<sup>2</sup> terminal for + DC 24 V, 0 V and FE. Power distribution up to max. 80 A by plugging in 3 busbars.
- **Connection module 18plusS-AM** for the plug-in type circuit breakers. Single-way modules help realising distribution systems with up to 30 slots. 2-way connection of DC 24 V loads via L+, 0V and FE with 4 mm<sup>2</sup>



push-in terminals. Group signalling "make contact" is already connected in series internally.

- **Signalling module 18plus-SM** with 10mA load and green LED to indicate OK condition of the aux. circuit and the reliable connection to the PLC.

**No one gets past the ESS30-S**

The »Low Energy Breaker« has innovative switching concepts like reducing the overall power loss by approx. 30 %. And all this at a 30% height reduction. The integral **current limitation** at 1.2 times rated current provides reliable protection of DC 24 V components and prevents hazardous system conditions. The standard-compliant »physical isolation« prevents any form of load circuit feedback on the DC 24 V level in the event of a failure. Fixed current ratings from 0.5 A to 10 A and a trip curve for

all loads results in a simple formula for electrical planning:

**"Trip current" = "Max. Current = 1.2 times rated current"**

This means: The effect of a failure in the load circuit, such as short circuit or overload, can easily be calculated beforehand.

**The future of the 18plus and Industry 4.0**

In the future the **18plus** will replace the conventional signal wiring for the **ControlPlex® DINrail** intelligent power distribution systems. Inclusion of the plug-in type **CPC10 bus controller** for **IO link** in the control system allows additional functionality in combination with the ESX50D-S electronic circuit protector. Configuration of devices, load current and load voltage.



Two new players: electronic circuit protector **ESS30-S** and power distribution system **18plus**

**At a glance – Module 18plus power distribution system**

- Reduction of component costs for wiring and additional components: Cable harness and power distribution already included.
- Reduction of total costs: electrical planning, assembly, system maintenance and procurement becomes easier.
- Highly flexible: the module can be fitted with various circuit breaker models for each DC 24 V application.

**At a glance - ESS30-S electronic circuit protector**

- "Low Energy Breaker": economical, small, compact - can be plugged into 17plus, 18plus and SVSxx power distribution systems.
- Physical isolation: ease of trouble-shooting due to an open clearance - no residual voltage, no feedback. Off is off is off.
- Protection with integral current limitation: ease of planning and calculation - high system availability, reduction of downtimes





Circuit protector **REX12-T** provides economic and adaptive DC 24 V protection

## ■ A neat and smart connection

DC 24 V power supplies play a vital role in many automation applications. Electronic protection components are often used for selective protection.

Besides functionality, an economic and flexible protection solution is important. Today, only the cost-effective single channel solutions excel in flexibility and scalability. The new generation of electronic overcurrent protectors made by E-T-A are flexible solutions with a compact design - meeting the technical and economic requirements of machine and panel builders.

No additional accessories are required when connecting individual components electrically and mechanically. This helps to save time and money!

The new combination of individual components consists of the **EM12-T** supply module and the **REX12-T** single-channel electronic circuit protector

that allows modular side-by-side mounting. The modules are only 12.5 mm wide, feature push-in technology and allow time-saving and maintenance-free wiring without tools. The supply module is designed for DC 24 V and 40 A and accommodates max. 10mm<sup>2</sup> with wire end ferrule as a positive supply. On the load output side the protection module can be wired with 2.5mm<sup>2</sup>.

**Innovative connection technology:**  
Snap it on - close the lever - done!



Supply module **EM12-T**

Circuit protector **REX12-T**



©Michelle Albers/Fotolia.com

The **REX12-T** features a unique hinged bridge mechanism that seamlessly links the individual devices for supply and signalling. Up to 16 devices can be placed on the DIN rail side-by-side and can be electrically connected without additional accessories. No jumpers or busbars required.

The **REX12-T** also provides system flexibility that allows load current adjustments or device replacement at a later date without any problems. Just open the left and right hinged lever of the circuit protector and remove the unit in question. **Put in a new unit, close the hinged levers, done!**

Besides the innovative modular mounting design the **REX12-T** also provides well proven selective overcurrent protection. Failures are signalled to the user via LEDs and auxiliary contacts. They allow targeted trouble-shooting that increases machine run-times.

The new protection solution has a characteristic curve specifically for DC 24 V applications. The device disconnects in less than 10 ms in the event of a short circuit. This effectively protects switch mode power supplies against overload. The **REX12-T** tolerates capacitive loads up to 20,000  $\mu\text{F}$  without any problems. Therefore the user can operate and selectively protect even sensitive and intelligent loads. The circuit

protector is available in all standard current ratings from 1 A to 10 A.

The internal fail-safe element, which is sized directly to the current rating of the circuit protector, allows easy adjustment to the cable cross section. This means: current rating equals fail-safe element.

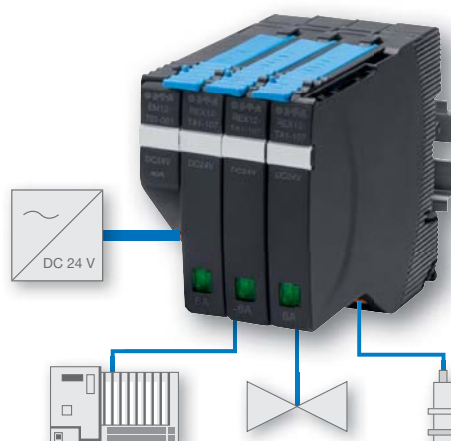
Thus a 1A rated **REX12-T** holds a 1 A blade fuse to IEC 60127-4/2 and to UL248-14. The device meets the requirements of VDE 0100-530, which reflects the requirements of the EN60204-1. Besides the usual CE conformity, the **REX12-T** meets UL2367 requirements and is UL508 listed. Therefore, it is appropriate for UL508A applications without hesitation.

#### At a glance - REX12-T/EM12-T

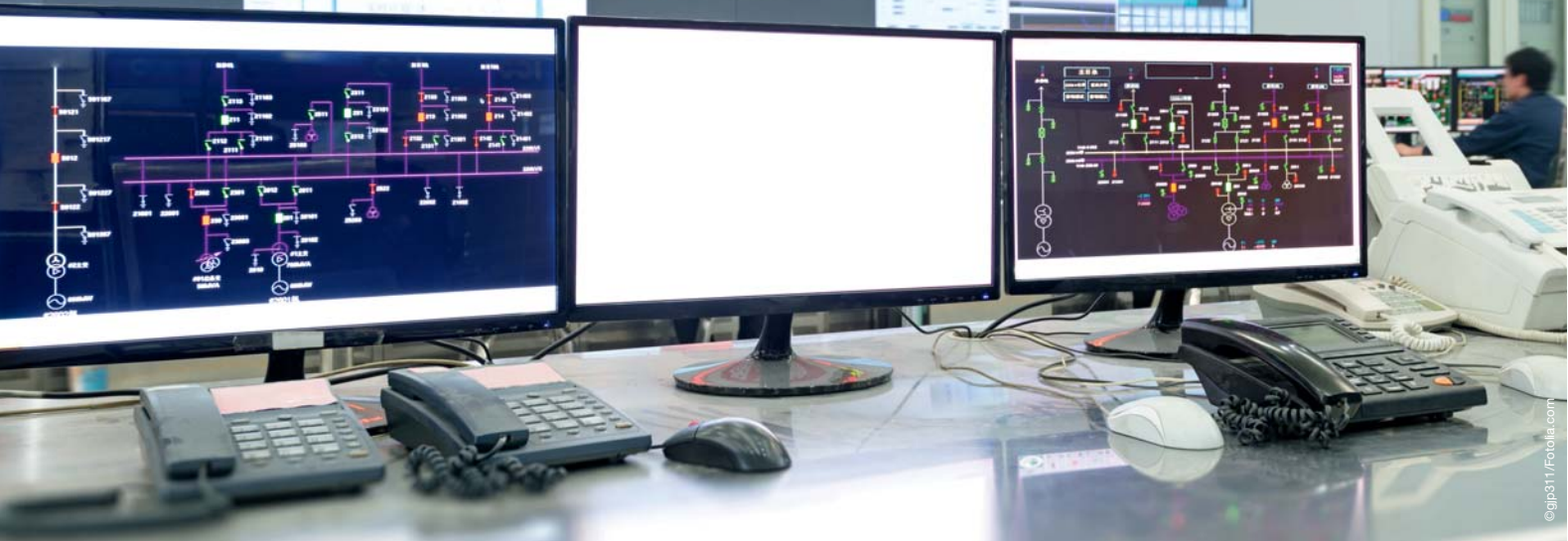
- Voltage rating: DC 24 V
- Current ratings: 1 A, 2 A, 3 A, 4 A, 6 A, 8 A, 10 A
- Capacitive load: 20,000 $\mu\text{F}$
- Temperature: -25 °C ...+60 °C
- Width: max 12.5 mm
- Terminal design: push-in including pusher
- Mounting: DIN rail
- **No accessories required!**

#### Conclusion

The **REX12-T** circuit protector allows the customer to design an economical DC 24 V protection system with side-by-side mountable circuit protectors, requiring only minimum wiring efforts and no additional connection accessories whatsoever.



**REX12-T...**  
provides economic and adaptive DC 24 V protection



Power Plant Operator in Austria Relies on **ControlPlex® Rack**

## Intelligent and smart

Ever since it was founded, Illwerke AG has specialised in creating peak-load and control-load energy for storage power stations and pumped-storage hydropower plants. Illwerke power plants and facilities are used to maintain the balance between consumption and generation of electrical energy and are interconnected via communication networks.

**Current:** VIW operates pumped-storage hydropower plants and generates energy in an eco-friendly manner. What are the daily technological challenges you are facing?

**Mr. Walsler:** We need to ensure continuous system availability of the power plants and the related control and communication technology. This is particularly difficult because some of these systems are located in remote alpine regions that are not easily accessible.

**Current:** **ControlPlex® Rack** is an intelligent power distribution system with electronic circuit protectors and an integral bus system for controlling, monitoring and protecting communications equipment. What are the benefits of this system for you?

**Mr. Walsler:** Intelligent and smart current protection concepts allow us to implement a lot of additional functionality within one

system and only one unit. This helps us minimise downtimes and reduce operational and maintenance costs. The modular and service-friendly design of the **ControlPlex® Rack** permits trouble-free system operation and also allows easy functional extensions because the components are hot-swappable.

**Current:** Where does the **ControlPlex® Rack** make trouble-shooting easy in your plants?

**Mr. Walsler:** In all safety-relevant and control-relevant spots. Any faulty load can be disconnected quickly and selectively with the ESX300-S. In the event of a short circuit or overcurrent, other fully functional loads remain unaffected. Remote control capability allows fast and time-saving reset of computer-controlled loads in the event of functional problems, even in remote areas. Problems can be detected and resolved at a very early stage, even before an actual



Power Distribution System **ControlPlex® Rack**

failure, based on the data supplied by the **ControlPlex® Rack**.

**Current:** Do you use a management system for monitoring and controlling your plants?

**Mr. Walsler:** Yes, it allows us to centrally control centralised systems. The **ControlPlex® Rack** supports SNMP protocols which allows us to integrate it into our existing management system so that we can make use of all advantages of a centralised alarm, control and monitoring system.

**Current:** How would you describe the **ControlPlex® Rack** system?

**Mr. Walsler:** A highly flexible system, featuring intelligent overcurrent protection and a lot of functionality.

**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.*



## Thomas Kramer

In July 2015, Thomas Kramer took over the Business Field Manager position for the chemical, pharmaceutical, foodstuffs and oil & gas industries in E-T-A's IEE Division. Thomas has many years of experience in the industrial automation technology industry that will make him successful in further developing the market in close co-operation with our global sales organisation and international lead customers. His new role also includes product management for E-T-A's **ControlPlex® Board** and **DIN rail** intelligent power distribution systems with fieldbus and Ethernet connection.



Interdisciplinary collaboration with PI/PNO, ODVA or ETG organisations and active attendance of ZVEI-expert-committees on the topic of automation are further focal points of his work.

## Christoph Boueke

Christoph Boueke joined E-T-A Circuit Breakers Ltd in England in March 2015 as Managing Director.

Mr Boueke has a degree as "Diplom Betriebswirt (FH)" and has worked in the Mechanical Engineering Sector / Plastics Industry and managed international companies in England, North America and Germany. He has a strong sales background with, specific strengths in multi-channel business-to-business sales, business development and change management within highly competitive markets in a global environment. His aim is to secure the long-term success of the organization in the UK across all business fields with a focus on Automation & Process Control, Equipment, Systems, Automotive Manufacturing, Watercraft & Specialist Vehicles, Aerospace, Rail and Energy and to continue to make a significant contribution to the success of the E-T-A Group.



# FAQ

*Hype or promise?*

## »What's actually meant by Industry 4.0?« (part1)

*Historically, industrialisation started with the "Industrial Revolution" in England in the 18th century. The next step was in the 20th century when Henry Ford introduced mass production.*



*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)**

Since the 1970s, electronics and IT have enabled an increase in the automation industry. Today, the interconnectedness of man and machine in the Smart Factory creates highly efficient production processes. The term "Industry 4.0" was first coined at the Hanover Fair in 2011 to describe this phenomenon.

### Is the term »internet of things« a synonym for Industry 4.0?

Yes, the term »internet of things« (IoT), which is frequently used in the US, describes the interlinking of clearly identifiable physical objects (things) with a virtual IT structure. It no longer consists only of human participants. And this is also the idea of Industry 4.0: Man communicates with machine and vice versa.

### Do we have the technologies for Industry 4.0?

The basis is a so-called cyber-physical system (CPS) which connects existing communication, IT, data and physical objects with each other. Thus a conventional factory becomes a Smart Factory. Machines communicate with products and other machines, objects supply process-critical data and information is processed in real-time. This will change the entire industrial ecosystem.

### What are the risks held by Industry 4.0?

Germany and China agreed to work together on Industry 4.0. However, experts, caution against possible risks. Data security and harmonised data standards are the

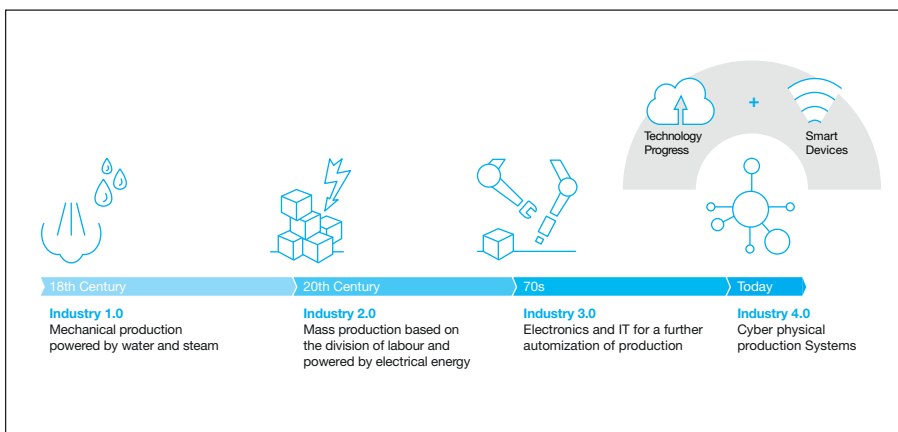
biggest challenge. There is still a lot of work to do if we want to implement Industry 4.0 in reality.

### What is the biggest challenge of Industry 4.0?

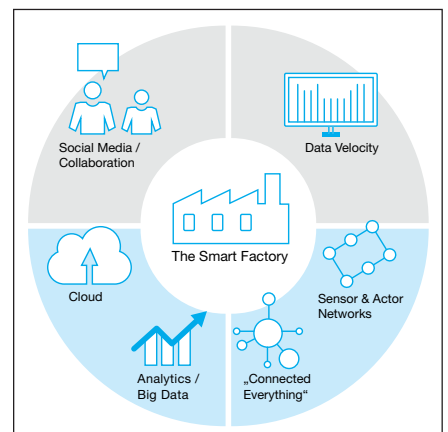
The biggest challenge is how to manage and master a huge amount of data (big data) within very short periods of time. Individualisation of products as far as «batch size 1» has not been solved yet either in the Industry 4.0 environment. It will also be a delicate matter to control the strategic interfaces so proprietary information is not available to competitors or to one's own customers. The IT specialists required for this digitisation of production will have to be trained first.

### Who knows the term Industry 4.0 outside of Germany?

People in China may have heard of the term since the German Vice-Chancellor Sigmar Gabriel mentioned it there during a visit. In most other countries it may be rather unknown. The initiative AMP 2.0 (Advanced Manufacturing Partnership) was started in the USA: The Japanese equivalent to Industry 4.0 is the IVI (Industrial value chain) initiative. The French Government proclaimed a French alliance "L'industrie du futur" (industry of the future), under the leadership of Dassault.



The technological development from **Industry 1.0** to **Industry 4.0**



The "smart factory" as the centre of a cyber-physical system



Dipl. Ing. Klaus Balzer,  
Head of Sales Europe at E-T-A

Protect your safety switchgear - observe the Machinery Directive

## More than meeting standards

If you want to use your safety switchgear according to regulations and meet the requirements of the **Machinery Directive 2006/42/EC**, you need professional protection.

Safety switchgear is widely used in DC 24 V automation and process control applications.

However, when it comes to protecting the essential safety switchgear, a very vital safety aspect is often underestimated: These safety devices are jeopardised both by capacitive loads and by short circuits.

The lack of protection often leads to a regular overload of the safety switchgear in the application. Electronic circuit protectors, with active current limitation, can effectively protect safety switchgear.

The following formula can be applied for rating the protective element correctly:  

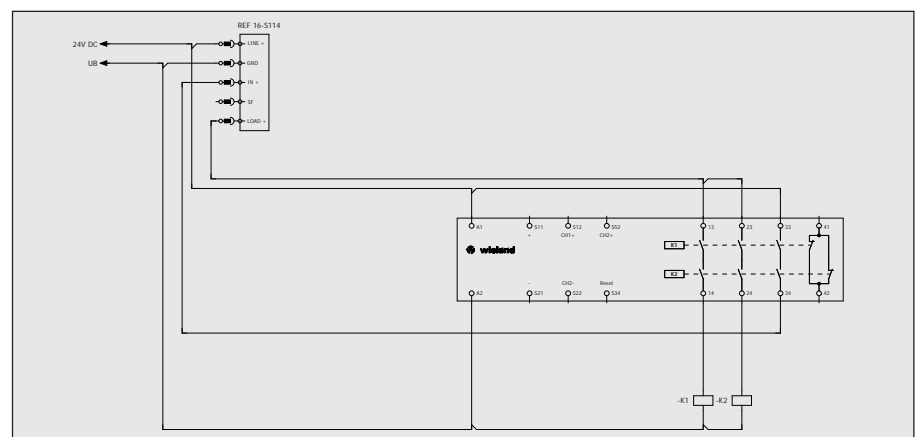
$$\max I^2t_{\text{relay}} > I^2t_{\text{protective element}}$$

Although the market for electronic circuit protectors has grown, only a few products are really suitable for this type of protection. To do this, the working principle of an electronic circuit protector must be complemented by active current limitation. This functional scope makes E-T-A's REF16-S electronic circuit protector a genuine plug-and-play solution for this problem.

The  $I^2t$ -value of the REF16-S is easily determined because both trip time and maximum current (active current limitation) are obvious.



Safety switchgear has become indispensable in factory automation today.



Only direct protection of safety switchgear ensures impeccable operation.

For the user they provide several benefits:

- Extended life span of the safety switchgear
- Reduced cost due to longer component endurance as well as enhanced system availability
- Meets Machinery Directive standards and requirements



Electronic Overcurrent Protector REF16

## 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 used: 3120 with undervoltage release module*

## Inadvertent restart safeguard

Heidolph Instruments GmbH & Co. KG, located in Schwabach near Nuremberg, is a global manufacturer of innovative laboratory equipment such as rotating evaporators, magnetic stirrers, shakers and mixers.

Heidolph appliances are fit for continuous operation and are designed for an average service life of at least 10 years. This superior quality has positioned Heidolph as one of the leading companies in this industry for many years. Their rotating evaporators are automatically controlled by the "Distimatic" which is an automatic module fitted with the 3120 circuit breaker/switch combination with undervoltage release module. It serves

as an ON/OFF switch for the module and at the same time protects the Distimatic against overcurrents. Moreover, the undervoltage release module ensures the rotating evaporator does not automatically re-start when voltage is restored after a power failure. The Machinery Directive 2006/42/EU requires an inadvertent restart safeguard to protect the operator.



*E-T-A type used: 3120 circuit breaker/switch combination with undervoltage release module*



*E-T-A type used: PVSEC Firefighter Switch*

## ■ Safety in PV systems

The **enwitec electronic GmbH & Co.KG**, located in Roggling in southern Germany, is a family-owned company and a major manufacturer in the Renewable Energy industry, producing the entire connection technology for photovoltaic systems and energy storage solutions.

Based on decades of experience and a strong connection to the market, enwitec has become a highly acclaimed partner in European business. In September, enwitec supplied 40 generator connection boxes with 2 PVSEC firefighter switches per box for a 2.8 MW roof-top system. The PVSEC switches all DC cables installed in the

house to zero potential. Public buildings, industrial buildings and warehouses present even higher safety requirements. enwitec combines the standard connection technology for PV systems with the PVSEC firefighter switch making it possible to offer individual and scalable solutions even for the megawatt range.



*Generator connection box made by enwitec electronic GmbH & Co.KG*



*E-T-A type used: Firefighter Switch PVSEC*



E-T-A **PowerPlex**® for day-to-day on-board peace of mind

## Caught by the yachting fever

Open-Sea fishing is very popular in the US. For more than four decades, The Viking Yacht Company has built luxury sportfishing and cruising yachts. Its latest flagship boat, the 92C, is again setting the standard in the industry for luxurious sportfishing boats. Particularly ambitious anglers will definitely appreciate what this boat offers during fishing tournaments held throughout the year.



The Viking 92 Convertible is as manoeuvrable and as fast as much smaller yachts.



**PowerPlex**® controls and monitors the entire on-board electrical system and always keeps the owner and crew up-to-date on the electrical systems via touch screens.

For Viking, founded in 1964, quality is of utmost importance. Viking designs and builds its yachts in-house and stands by the “90 percent factor” which means 90% of the vessels components are built in-house with the exception of engines and appliances. Viking has used BUS technology since 2000 to control and protect on-board electrical systems. For the new 92C and 75MY models, they opened up a whole new chapter by selecting the **PowerPlex**® and E-T-A as its design partner.

The **PowerPlex**® system allows convenient control, monitoring and protection of all AC and DC loads on-board with two touchscreens. **PowerPlex**® also helps manage complex control tasks including:

- control of nine air conditioning systems
- tank-to-tank fuel transfer
- control of the water purification system

**PowerPlex**® ensures that everything functions correctly and precisely. Various alarms inform the crew in realtime about undesired behaviour of the devices and the on-board electrical system. Most of these can easily be reset by pushing a button. The alarm memory saves alarm messages to be accessed later – very convenient when you go at full speed.

The entire system configuration and user interface are developed by E-T-A in close co-operation with Viking. However, it is not necessary for E-T-A to be onsite for the duration of the projects.

The **PowerPlex**® system configuration is tailored to the specific requirements of an individual yacht and is transmitted with **PowerPlex**® Ready via remote access. To do this, Viking only needs to switch the yacht into the online mode.

The system hardware is installed in IP67 rated enclosures to ensure it can withstand the environmental demands of the vessel. E-T-A also designed a custom AC **PowerPlex**® Module for Viking with 8345R remotely controllable circuit breakers.

# CULINARY DELIGHTS

*Typical American:*

## »Seafood Boil« (stove-top clambake)

*Adding the ingredients in the right order is the secret to this recipe's success: the ones that take longest to cook go in first. The optional layer of seaweed (available from most fishmongers) imparts a salty ocean essence and keeps the potatoes off the bottom of the pot.*

### Directions

Combine onions, garlic, pale ale, and water in a 16-quart stockpot. Cover with a layer of seaweed (or place a steamer basket on top of onions). Add potatoes, chorizo, and 1 tablespoon salt. Bring to a boil. Add lobsters; cook over high heat, covered, for 15 minutes. Add clams and corn; cook, covered, for 6 minutes. Add mussels and shrimp; cook, covered, until clams and mussels open and shrimp are cooked through, 4 to 8 minutes.

Remove seafood, corn, potatoes, and chorizo using tongs, and transfer to large platters or rimmed baking sheets. Discard seaweed and any unopened clams and mussels. Strain liquid through a sieve into a bowl; add butter, swirling to melt. Squeeze lemons over clambake.

### Ingredients (for 8 servings):

- 2 large or 3 medium onions, cut into large wedges
- 6 garlic cloves
- 1 bottle pale ale or medium-bodied beer
- 1 cup water
- Fresh seaweed, well rinsed, for layering (optional)
- 1 1/2 pounds small new potatoes (white, red, or a combination)
- 1 pound hot dried chorizo, cut into 1/2-inch pieces
- Coarse salt
- 3 lobsters (1 1/2 pounds each)
- 36 littleneck clams, scrubbed well
- 4 ears of corn, husked and halved
- 2 pounds mussels, debearded and scrubbed well
- 1 1/2 pounds large shrimp (about 30), shell-on
- 2 tablespoons unsalted butter (optional)
- 2 lemons, halved



Typical American  
»Seafood Boil«  
(stove-top clambake)





# Skilfully coupled



**User-friendly** – that's exactly what it is:  
The new electronic circuit protector **REX12-T**.

A smart design helps you combining single-channeled devices at record speed and **no tools or accessories required**. It all adds up to a tailor-made DC 24 V protection for your system.

**Electronic protection by means of the REX12-T:**

- saves time and cost through ease of mounting
- is the ideally rated fail-safe element
- provides transparent planning

Talk to us! We look forward to consulting you.

[www.e-t-a.de/cu\\_e1-16](http://www.e-t-a.de/cu_e1-16)



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