E-T-A®
ENGINEERING TECHNOLOGY

Protecting – switching – monitoring
Automation technology and plant engineering

Contents

A company
with a vision

Welcome to E-T-A
Founded in 1948, E-T-A pioneered the development of precision performance circuit breakers for equipment protection and is now the market leader in the field of overcurrent protection and power distribution. We produce a wide range of circuit breakers and electronic circuit protectors, solid state relays and remote power controllers, power relays and system solutions for global markets in our production facilities in Germany, Tunisia, Indonesia and the USA.

One thing is always at the heart of our endeavours: E-T-A products provide protection. In everything we do, with each and every unit we supply that our customers install in their applications, we protect man and machine against the effects of overcurrent and short circuit.

For this purpose we offer mechanical and electronic solutions, single components or entire systems, standardised or customer-specific. We ensure that the current, without which our modern life is simply unthinkable, remains manageable. We ensure that it does not cause any damage in the event of a failure.

The protection of lives is at the core of our endeavours.
This is also a matter of value protection. We ensure that the equipment and systems where our solutions are installed do not get damaged by the consequences of overcurrent and short circuit. We ensure permanent function, smooth production and eventually the profitability of the target products. No matter if it is an assembly line, a chemical production plant, a machine tool or if it is only one component or an entire system including power supply.

Dr. Clifford Sell
Director
E-T-A Elektrotechnische Apparate GmbH

We know that you want to offer your customers the best possible solution. You'll manage even better by using E-T-A's superior quality solutions. We hope we can support you with our products and make the world a little safer.
Please do not hesitate to get in touch.

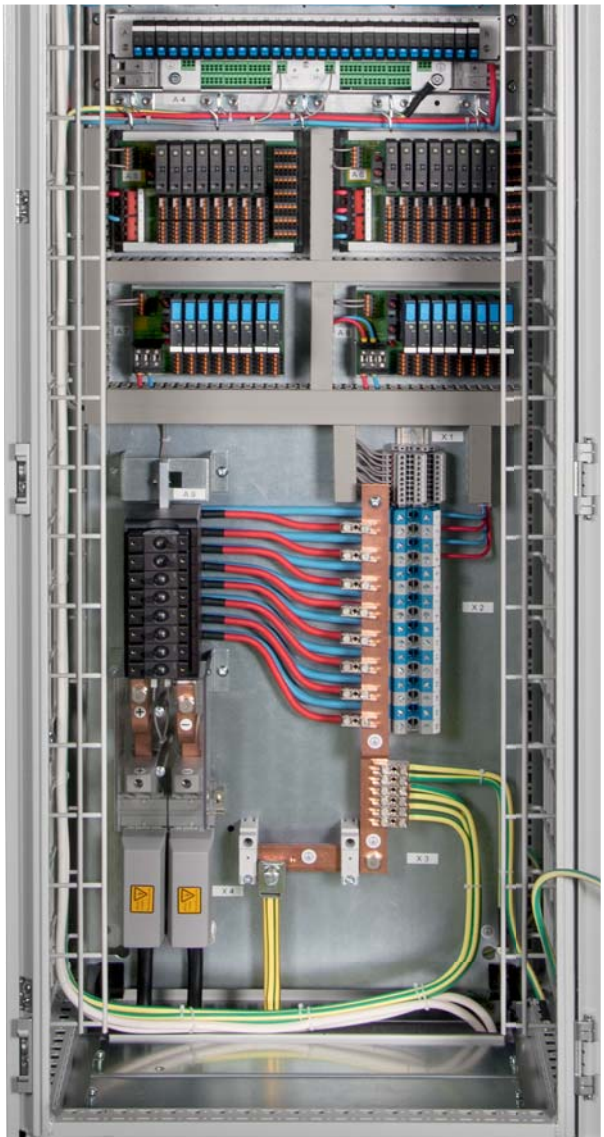
E-T-A for the machine building industry

Requirements regarding machine uptime and process transparency are constantly rising. The more automation technology is used in production, the higher the requirements regarding the power supplies - also in the DC 24 V sector. E-T-A offers circuit breakers and comprehensive protection solutions for AC 230 V. In addition we can supply clever tailor-made solutions for the protection in DC 24 V applications as well as for the protection of the switch mode power supply and for ensuring selectivity.

Conventional devices for line protection (MCBs) at a switch mode power supply do not trip in the event of a failure due to the low overload capability of the switch mode power supplies. The power supply voltage fails. The DC 24 V supply for the control units or the sensors is no longer ensured. Electronic overcurrent protection made by E-T-A offers the necessary selectivity in the event of a failure and ensures maintenance of the supply voltage. This significantly increases machine uptime. At the same time it supports trouble-shooting in the event of a failure because the faulty path is clearly marked.

If an intelligent electronic overcurrent protection is connected to a field bus system, there are even more diagnostic possibilities. Other system messages such as overload, undervoltage, short circuit etc. help to increase system transparency and to significantly reduce trouble-shooting.

E-T-A products help to increase machine uptime and system transparency.



Independent of the industrial branch, all plants and systems have one thing in common – the control cabinet or power distribution box. For all these applications E-T-A offers a comprehensive product range for the protection of load circuits. It covers the AC 230 V level via voltage conversion by means of competitive switch mode power supplies as well as a range of circuit breakers for equipment protection and electronic overcurrent protection for DC 24 V applications.

E-T-A is your partner when it comes to overcurrent protection.

E-T-A for
car production

Decentralised power distribution systems are getting more and more important in the automotive industry. They are able to distribute energy to all spots where it is actually required. At the same time system transparency is increased due to the proximity of the switching devices to the loads.

E-T-A supports this development by innovative products such as the terminal block system **Module 18plus**. It allows direct wiring of load, mass and earth at one terminal and thus provides artlessness, quick wiring and high transparency in protection. Various plug-in type circuit breakers with different functional characteristics provide flexibility. The range reaches from artless thermal devices to smart electronic protectors.

E-T-A is a complete solution provider of decentralised power distribution solutions. They help to save time and costs and the modular system allows implementation of custom designed adjustments. We can find a solution for any requirement: **Easy, quick and transparently wired with plug-in type protective devices and intelligent connection upon request.**

E-T-A for
process control

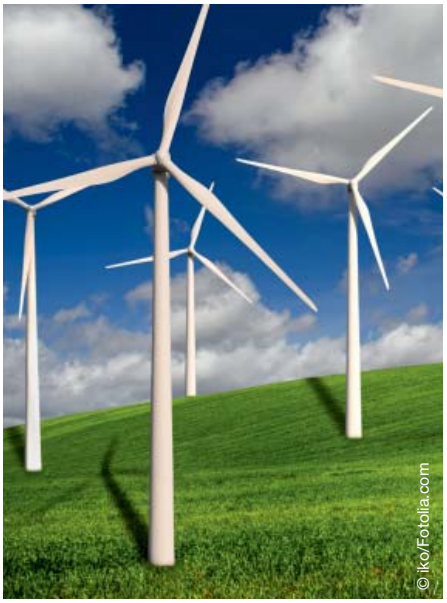
Particularly in distributed systems, transparency and reliable protection of the loads become ever more important. E-T-A offers innovative products such as the intelligent ControlPlex system which meet these requirements. ***ControlPlex®*** combines convenient wiring solutions with smart, parameterisable circuit breakers. Conventional circuit breakers are unable to trip reliably in the event of a failure if long cable lenghts are used in DC 24 V applications. This dilemma can be remedied by the E-T-A electronic circuit protectors. They reliably trip in the event of a failure and disconnect the faulty path from the power supply. ***ControlPlex®*** also provides reading and monitoring options for the circuit protection devices and thus brings about additional transparency in the system. This way the DC 24 V side can be monitored in detail. All warnings and alarm thresholds can then exactly be configured.

In systems with long cable lengths, E-T-A products increase system transparency and in the event of a failure they ensure reliable disconnection.

E-T-A for
power engineering

In power engineering, the protection of loads in distributed systems is also paramount. Very often, the issue is the protection of long load lines and different kinds of loads. The wide range of E-T-A circuit breakers for equipment protection offers comprehensive options for the appropriate protection - designed in accordance with cable length and load type. Their robust design allows switching of capacitive and inductive loads within a defined range. In addition E-T-A offers devices combining modern electronic overcurrent protection with a mechanical bimetal trip function. In the event of a failure this offers genuine physical isolation of the contacts. The E-T-A portfolio also holds devices with KTA approvals or ATEX.

E-T-A products are tailored to the requirements in the energy sector and offer customer benefits such as reliable disconnection by way of physical isolation.



E-T-A for

Automation technology and plant engineering

- MCBs
- Circuit breakers for equipment protection
- Switch mode power supplies
- Electronic overcurrent protection
- Fuse replacement
- Terminal blocks and power distribution systems
- Power distribution

Our solutions
for your products

In many industries, including machine construction, car production, process control and power engineering, E-T-A products are the tailor-made solution for your application because we offer a wealth of versions and configurations. On the following pages you will find an overview of our product range for these industries.

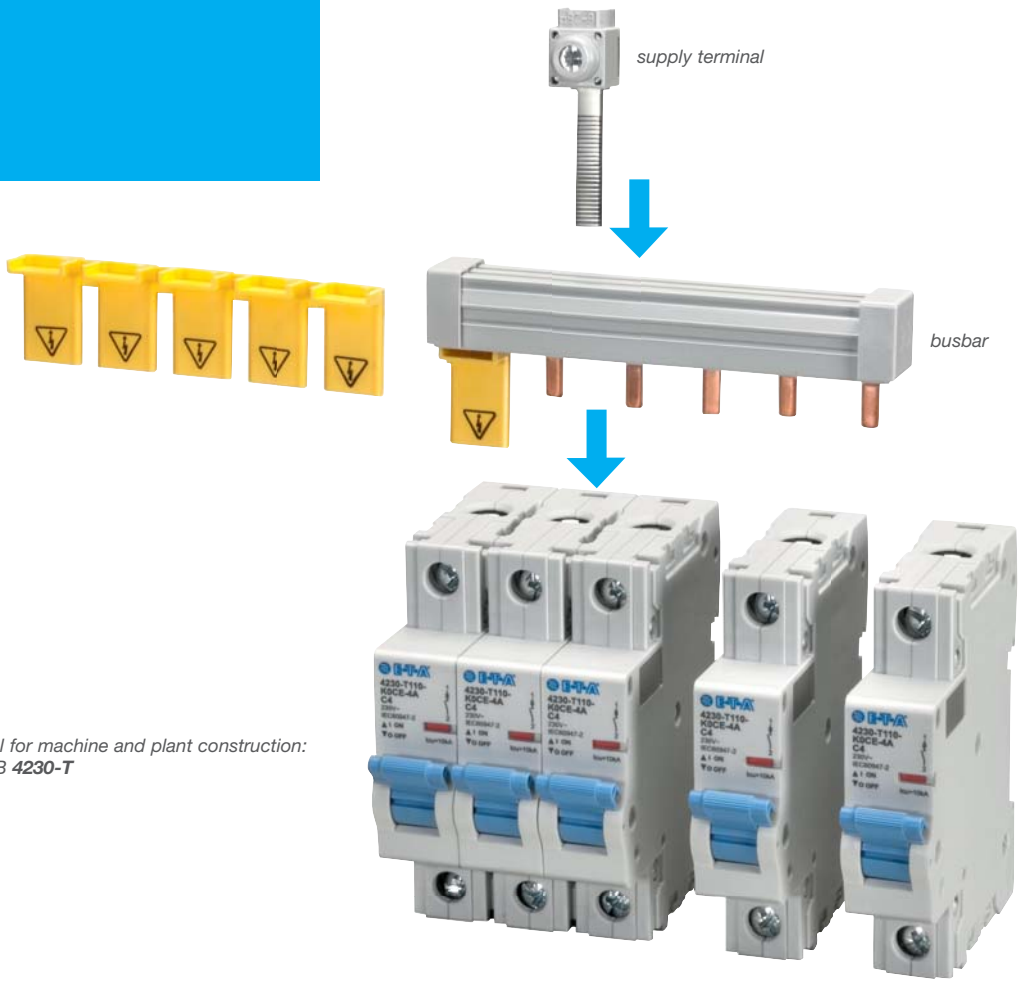
We are able to cover their entire demand and offer a comprehensive range of MCBs, electro-mechanical circuit breakers for equipment protection with a choice of operating principles, electronic overcurrent protection, switch mode power supplies and power distribution systems. Our portfolio comprises conventional as well as intelligent solutions. With regard to data link, we can also offer you the requested functional scope of our devices and solutions, whether it is artless, but efficient or flexible and comprehensive.

E-T-A products make factory automation and systems engineering even more efficient.

MCBs

4230-T

- Wide application range
- Reduction of inventory
- Time and cost reduction



*Ideal for machine and plant construction: MCB **4230-T***

MCBs
4230-T – the economic choice

Single or multipole track-mountable MCB with current ratings up to 63 A.

Its conformity with the relevant standards IEC 60947-2, UL 1077 and UL 489 makes the **4230-T** ideally suitable for worldwide use. Electrical add-on modules such as an auxiliary contact module or a working current module can be mounted on the left side of the breaker. Busbars for all standards allow efficient wiring and individual set-up of device combinations. A green/red mechanical status indication provides information on the switching condition on the front of the breaker.

Due to the high short-circuit breaking capacity of up to 10 kA the **4230-T** is above all suitable for AC applications in mechanical engineering.

Your benefits when using 4230-T:

- Global use through meeting all relevant international standards
- Inventory reduction through possible use in both AC and DC applications
- Time savings through flexible systems for conductor connection and terminals in all current ratings

Application in the industries

- Machine construction and process control
- Standard control cabinet solutions

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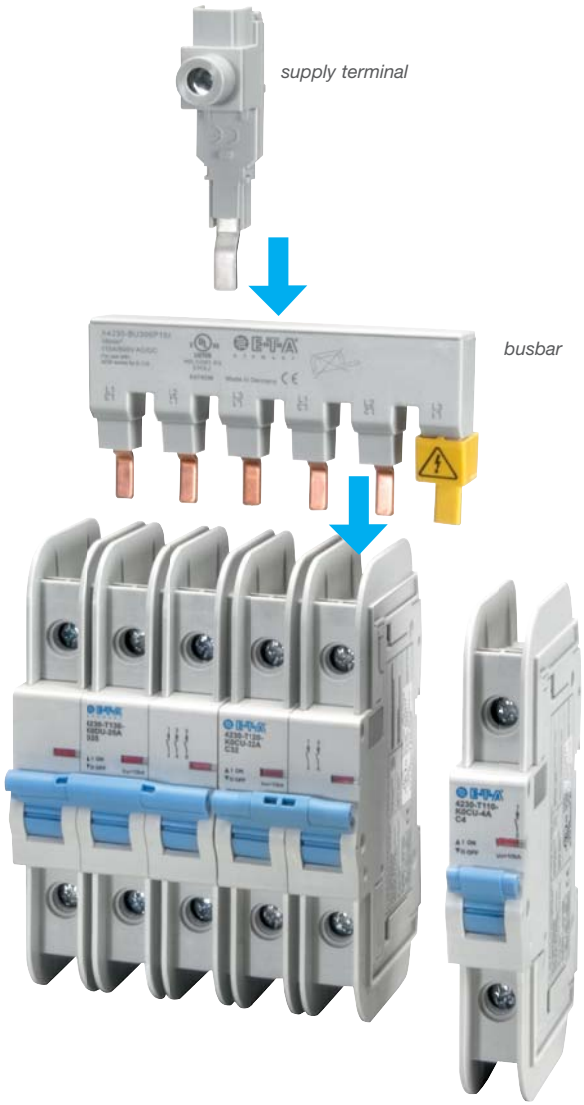
*The **4230-T** MCB has been designed for mechanical engineering*



A first class choice in the MCB range:
E-T-A 4230-T type

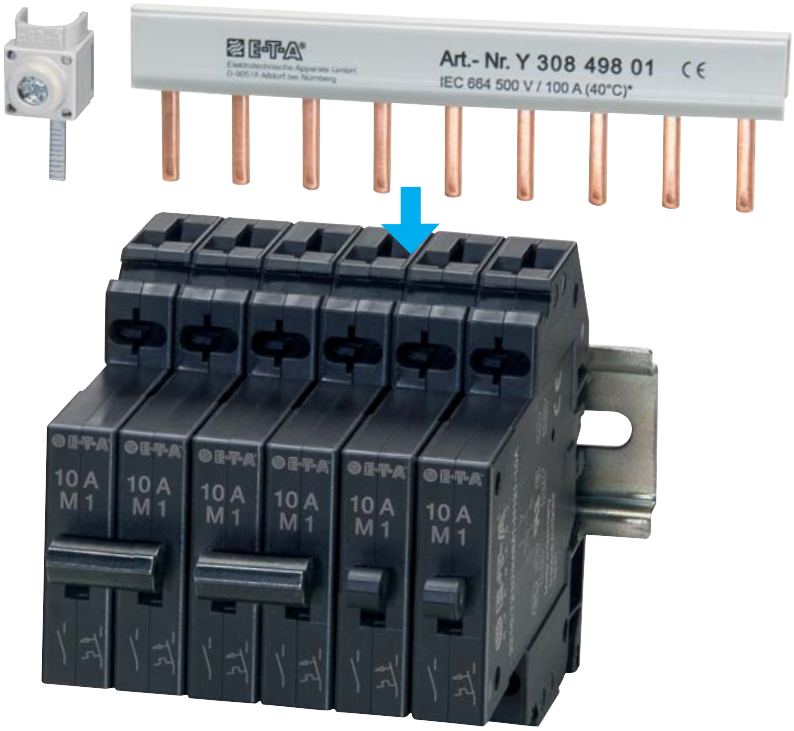
Circuit breakers for equipment protection

201
2210-T

- Space saving
- Wide application range

busbar

supply terminal



*The **2210-T** is particularly suitable for applications requiring an integral auxiliary contact*

Circuit breakers for equipment protection
201 and 2210-T – the clever specialists

Type 201
Single pole track-mountable thermal-magnetic circuit breaker with current ratings up to 16 A.

The **E-T-A 201** is ideally suited to basic applications where no auxiliary contact is required. Its push button for switch-on and the red manual release button offer a clear separation of ON and OFF function.

Type 2210-T
Single or multipole track-mountable thermal-magnetic circuit breaker with current ratings up to 32 A.

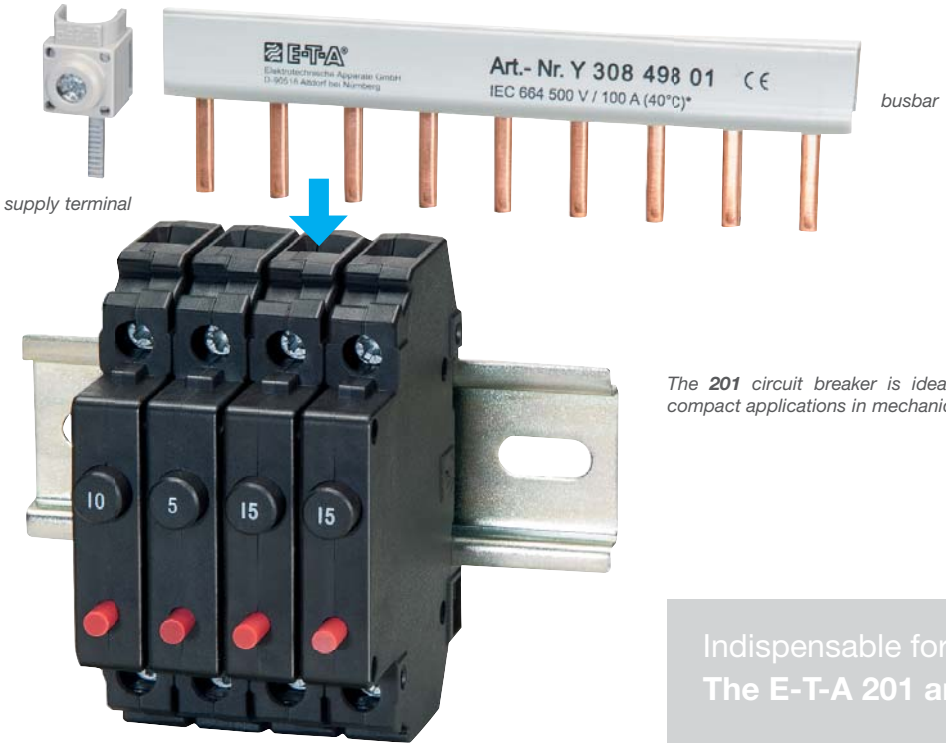
Thanks to its small width of only 12.5 mm including auxiliary contacts the **2210-T** is suitable for all compact applications in mechanical engineering. Its high rupture capacity up to 2.5 kA (DC 32 V) to IEC/EN 60934 makes it also suitable for battery-buffered applications. Fine current rating gradings and a range of different trip curves ensure precisely working overcurrent protection, specified in accordance with the load.

Your benefits when using 201:
- Space and weight savings through a very compact design with an installation width of only 12.5 mm and a height of 80 mm.
- Lower stocks due to one trip curve for all types of loads.

Your benefits when using 2210-T:
- Space and weight savings through a very compact design with an installation width of only 12.5 mm including auxiliary contacts.
- Reduced mounting time thanks to integral auxiliary contacts and comprehensive accessories including busbars, line terminals and jumpers.
- International approvals allow global use: VDE, UL, CSA, CCC, KC, GL

Application in the industries
- Machine construction, plant construction
- Process control
- Power plants
- Large machinery as in ship-building and road construction

*The **201** and **2210-T** circuit breaker types ensure safe operation of power plants.*



supply terminal

busbar

*The **201** circuit breaker is ideally suited to all compact applications in mechanical engineering.*

Indispensable for many applications:
The E-T-A 201 and 2210-T circuit breakers

Circuit breakers for equipment protection

2210-S

- Cost-saving
- Time-saving
- Flexible
- Reliable

*Power distribution system **Module17plus***

busbar
(pushed into a spring-loaded terminal,
no screws required for a tight fit)

Can easily be integrated into many applications:
*circuit breaker for equipment protection **2210-S***

*Thermal-magnetic circuit breaker **2210-S***

Circuit breakers for equipment protection
2210-S – the all-rounder for automation technology

Thermal-magnetic circuit breaker in various ratings from 0.5 A to 16 A for the voltage ranges AC up to 240 V and DC up to 65 V.

The **2210-S** circuit breakers are characterised by the small width including auxiliary contacts and plug-in type mounting. The plug-in design, suitable for power distribution systems, allows use of the **2210-S** in applications with maximum uptime requirements such process automation and power plants. The **2210-S** is universally suitable for AC and DC applications. The integral auxiliary contact is as a standard designed as make and break contact, but other combinations can be made available.

Availability of two different terminal block systems allows either use in AC 230 V systems or otherwise at DC 24 V. The AC 230 V system **Module 17plus** features a small installation height of only 115. The DC 24 V system **Module 18plus** has a height of 130 mm and includes additional functions such as signalling, busbar connection or group outputs.

Your benefits when using 2210-S:

- Space and weight savings through a very compact design with an installation width of only 12.5 mm including auxiliary contacts.
- Reduced mounting time due to integral auxiliary contact
- Ease of integration into machinery and optional selection and mounting of the circuit breaker later provide maximum flexibility. Even further terminal blocks can easily be connected at a later point in time.

Application in the industries

- Machine construction and process control
- Transportation including railways, rail engineering
- Also in power plant engineering and steel industry

*It has become an integral part of many applications, e.g. in the steel industry: the plug-in type **2210-S.***

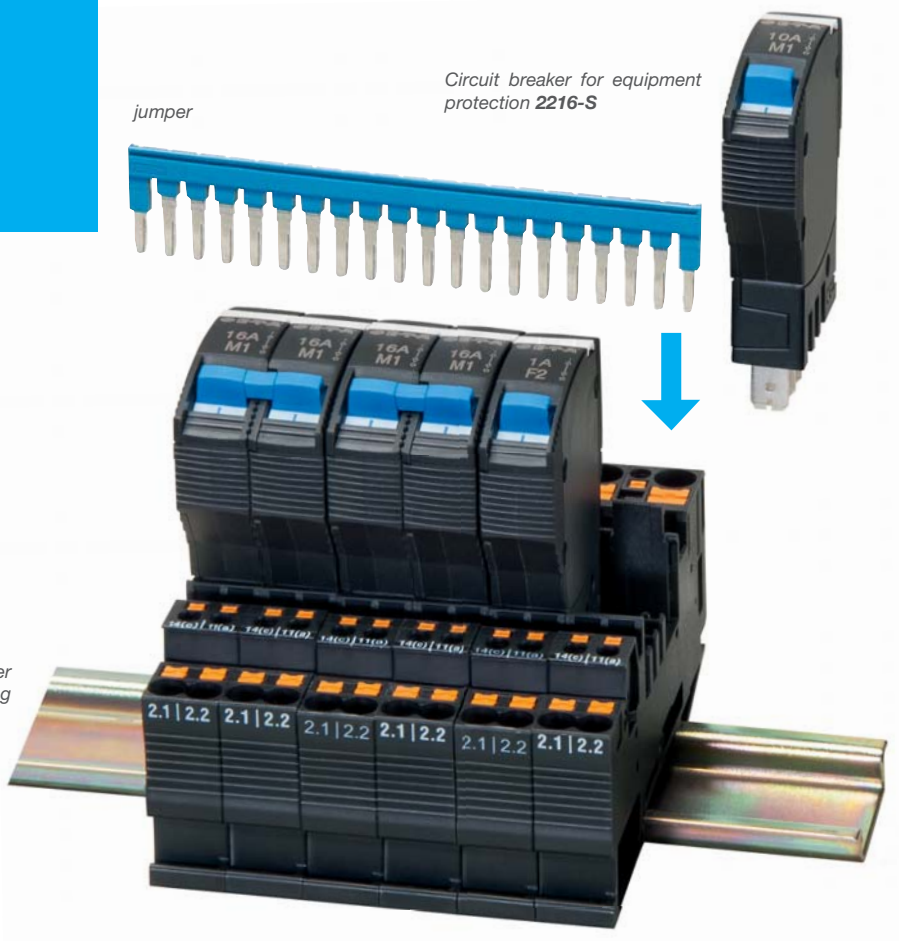
*Thermal-magnetic circuit breaker **2210-S***

Ideally suited for many automation tasks:
The E-T-A 2210-S

Plug-in type circuit breakers
for equipment protection

2216-S

- Flexible
- Modular
- Cost-saving
- Wide application range



*The **2216-S** circuit breaker is able to master automation tasks together with a matching terminal block system.*

Plug-in type circuit breakers for equipment protection
2216-S – slim and pluggable

Single or multipole thermal-magnetic circuit breaker with current ratings up to 16 A for AC 230 V or DC 50 V.

Its small width of only 12.5 mm including auxiliary contacts makes the E-T-A **2216-S** the ideal choice for any application where space is at a premium. The 2216-S circuit breaker offers optional integral auxiliary contacts (change over contact) for alarm functions and for status indication of the main contacts.

The combination with the terminal block systems **80plus/81plus** provides flexibility for the user from the design stage of his system until installation. The clever wiring system with busbar connection for line entry, signalling and neutral conductor allows fast and efficient – and therefore cost-saving – wiring.

A coding system in terminal block and breaker ensures protection against mix-up of current ratings. This makes the **2216-S** circuit breaker type ideal for the use in process control and power plant engineering as well as in machine construction.

The **2216-S** circuit breaker has been approved to IEC60934, UL1077 and UL508 and is therefore fit for international use.

Your benefits when using 2216-S:

- Cost-saving because it features ease of wiring and connection via busbars
- Shock and vibration resistant by means of retaining clips and sockets
- Flexible through ease of mounting and disassembly, modular design and convenient adjustment and selection of wiring options
- Ease of coding ensures safe operation and clear assignment of breaker and socket

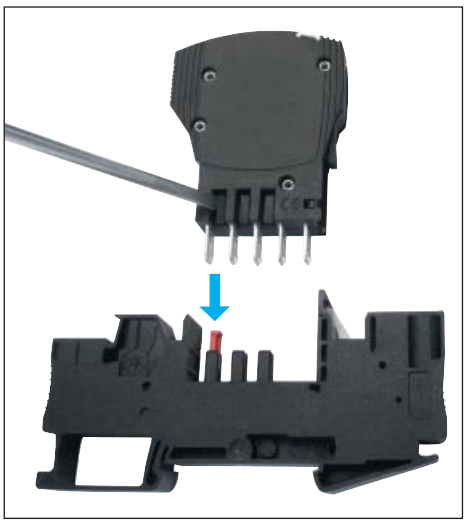
Application in the industries

- Machine construction and plant engineering
- Process control

*Compact solutoins for machine and plant construction: **2216-S** circuit breaker.*

Socket 81plus

Socket 80plus



Coding of circuit breakers and terminal blocks

Terminal block:
insert coding pins in accordance with coding table into receptacles of the sockets.

Circuit breakers:
remove coding pin in accordance with coding table by means of a screw driver

Your benefits:
Coded circuit breakers can no longer be inserted into slots with a smaller rating

True safety even in restricted spaces:
the E-T-A plug-in type 2216-S

Overview
Thermal-magnetic circuit breakers

Type	4230-T	4230-T	201	
				
Mounting method	symmetrical rail	symmetrical rail	symmetrical rail	
Standards, approvals	IEC/EN 60947-2, TÜV, UL1077	IEC/EN 60947-2, TÜV, UL489	IEC/EN 60934, VDE, UL1077, CSA	IE
Number of poles	1, 2, 3, 4 poles	1, 2, 3 poles	1 pole	
Characteristic curves	B: fast C: medium delay D: delayed	B: fast C: medium delay D: delayed	T1: delayed	
Current rating (A)	1 to 63 A	1 to 63 A	0.05 to 16 A	
Rated voltage (V)	AC 240/415 V; DC 80 V UL, CSA: AC 480 V Y/277 V, DC 60 V	AC 240/415 V; DC 80 V UL, CSA: AC 240 V: AC 480 V Y/277 V, DC 60 V	AC 240 V, DC 65 V UL, CSA: AC 250 V, DC 80 V	3 A
Auxiliary contact	add-on module 9 mm, on the left	add-on module 9 mm, on the left	–	
Dimensions (w x h x d)	17.6 x 65.7 x 82 mm	17.6 x 65.7 x 116 mm	12.5 x 60.5 x 80 mm	

Precise performance for tailor-made protection

The protective function of thermal-magnetic circuit breakers is provided by a combination of bimetal and magnetic coil. The thermal element of the circuit breaker protects by tripping with a time delay upon rising temperature caused by overload. The magnetic part responds without delay to high overload and short circuit currents and disconnects the faulty circuit within only a few milliseconds. Thermal-magnetic circuit breakers are ideally suited to devices and systems in telecommunications, process control and similar applications requiring precision performance in the event of overload and short circuit.

Characteristic features

- Powerful snap action mechanism whose single parts connect the power system with the contact system to ensure reliable ON and OFF operation in the event of an overload.
- A positively trip-free mechanism. The protective function will be ensured independently of outer influences, even if the actuator is blocked.
- Standard devices are optionally available with one or two electrically separate auxiliary contacts. They offer various signalisation and alerting functions.

Temperature behaviour

- The time/current characteristics are related to an ambient temperature of +23 °C. In the event of an overload, the trip times become shorter with higher ambient temperatures and longer with lower ones. In order to avoid premature or delayed disconnection with circuit breakers that are constantly used at

2210-T	2210-S	2216-S
		
symmetrical rail	pluggable, front panel mounting	plug-in type
C/EN 60934, VDE, UL1077, CSA, CQC, GL, KC	IEC/EN 60934, VDE, UL1077, CSA, CQC, GL, KC	IEC/EN 60934, VDE, UL1077, CSA, GL
1, 2, 3, 4 poles	1, 2, 3, 4 poles	1, 2 poles
F1 fast (DC) F2 fast (AC, DC) M1 medium delay T1: delayed	F1 fast (DC) F2 fast (AC, DC) M1 medium delay T1: delayed	F1 fast (DC) F2 fast (AC, DC) M1 medium delay
0.1 to 32 A	0.1 to 25 A	0.5 to 16 A
C 433 V, AC 250 V, DC 65 V UL, CSA: AC 277/480 V	3 AC 433 V, AC 250 V, DC 65 V UL: AC 277/480 V	AC 240 V (50/60 Hz), DC 50 V (single pole), DC 80 V (double pole)
integral	integral	integral
12.5 x 84 x 82.5 mm	12.5 x 78 x 47.8mm	12.3 x 51.2 x 45 mm

high or low ambient temperatures, a certain correction factor must applied.

Time/current characteristics

- The magnetic trip currents normally refer to AC supplies. In the event of DC supplies, the magnetic trip currents are increased by 20 %.

Approvals

- The thermal-magnetic circuit breakers meet the specifications of the VDE and the circuit breaker standard EN 60934 (IEC 60934) as well as of many international or also country-specific or user-specific standards. For detailed information please see the individual data sheets.

Switch mode power supplies

SMP

- Reduction of complexity
- Reliability
- Wide application range

*Switch mode power supply series **SMP21***

Switch mode power supplies
SMP – resilient and versatile

Compact, versatile switch mode power supplies for DC 24 V with a current rating range of 5 A through 40 A.

The switch mode power supplies **type SMP** perfectly fit into the range of electronic circuit breakers and protectors made by E-T-A, e.g. the **ESS30-S, ESX10** and **REF16-S** models with integral current limitation.

The SMP product group consists of a single- or three-phase supplied AC power supply and is the central component of the DC 24 V level which is composed as follows

- AC primary circuit protection by means of the MCB type **4230-T**
- Primary switch mode power supply type SMP with output voltage DC 24 V
- Protection of the DC 24 V load circuits by means of mechanical and electronic circuit breakers and protectors

The **SMP switch mode power supplies** supply their ratings of 5 A, 10 A, 20 A and 40 A at an operating voltage of DC 24 V. This corresponds to the power classes 120 W, 240 W, 480 W and 960 W. At an efficiency factor of up to 93 % these models are suitable for an ambient temperature of up to 70 °C.

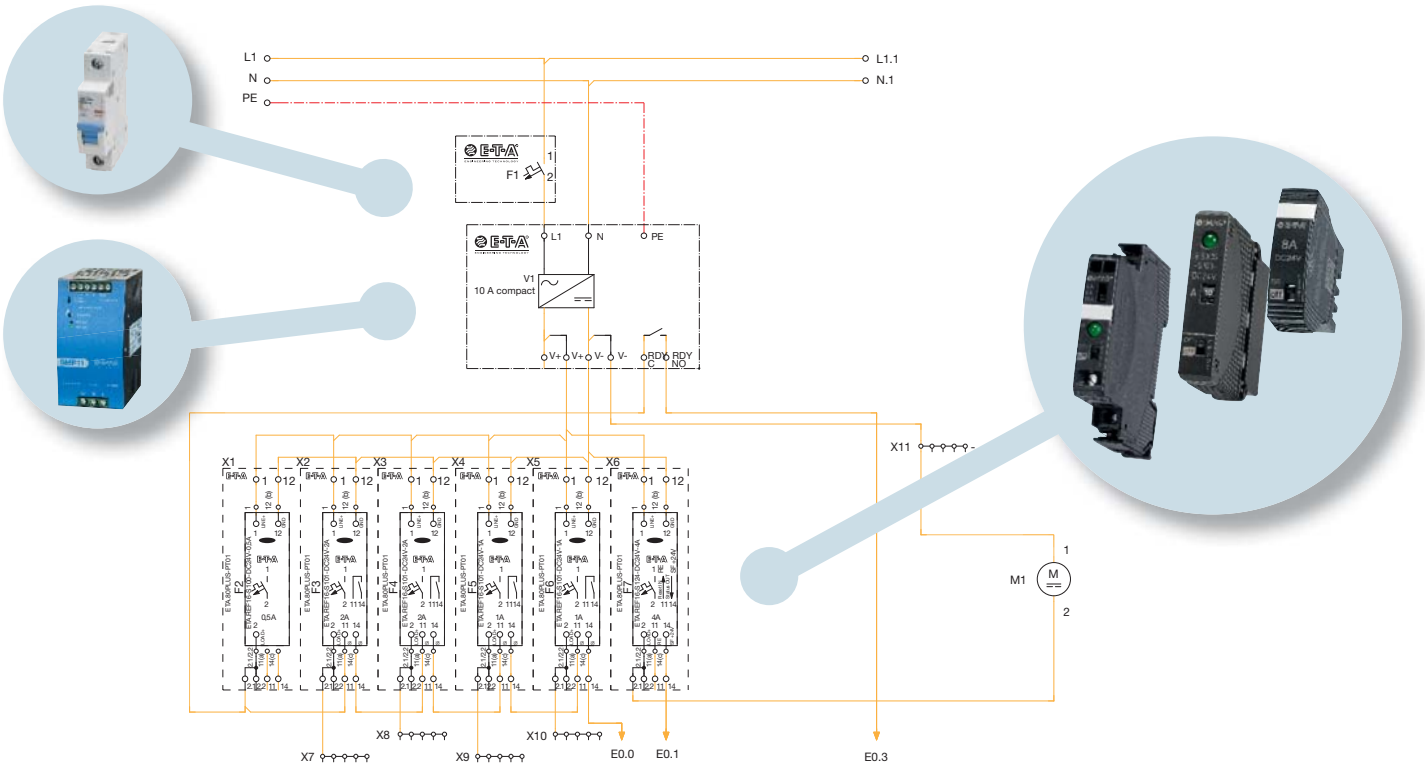
Your benefits when using switch mode power supplies of the SMP product group:

- Reduction of complexity through a powerful and cost-effective DC 24 V complete package including supply protection, switch mode power supply and electronic over-current protection.
- Consistent system of AC cable protection, switch mode power supply and DC 24 V protection
- Wide range of possible application through approvals to relevant standards in the major global markets

Application in the industries

- Machine construction
- Process control in the chemical, pharmaceutical, and foodstuffs industry, oil and gas
- Power plants and steel industry

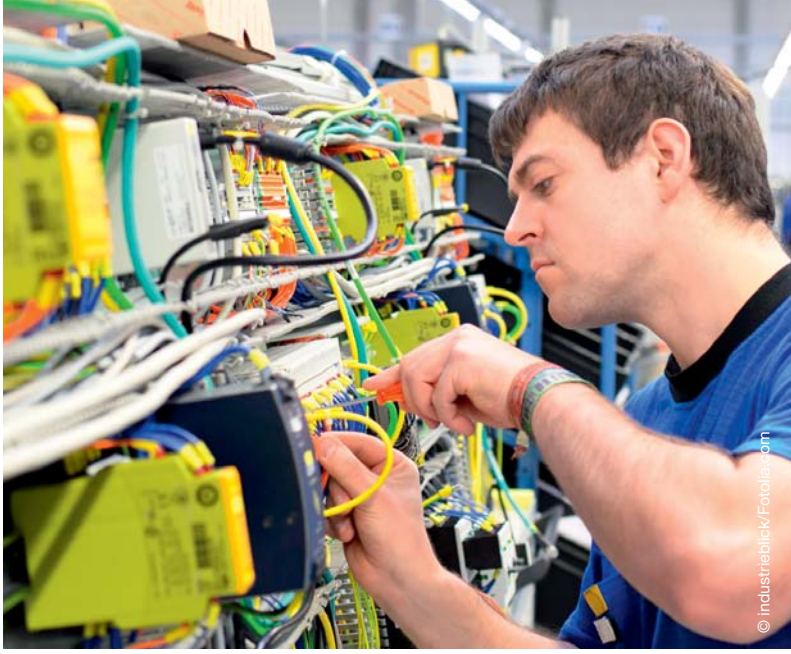
*Reduction of complexity and reliability make the **SMP** switch mode power supplies ideally suited for many applications.*



Application example

Electronic overcurrent protection

REX12



- Cost-saving
- Space-saving
- Flexible
- Increases machine uptime

Elektronic circuit protector ***REX12***

Electronic overcurrent protection
REX12 – cost-effective

Electronic overcurrent protection for the protection of DC 24 V track-mountable systems in single or double channel design with ratings from 1 A to 10 A.

The new series **REX12** has especially been design for the cost-conscious machine and panel builders. It is a single or double channel track-mountable unit, which can be mounted side by side and which features a smart hinged connector arm, allowing fast and cost-effective mounting without requiring further accessories.

The **EM12** supply module is the starting point. It is able to work with a supply current of up to 40 A at DC 24 V. It provides group signalling for the error messages. Single or double channel devices can then easily be mounted side by side to the supply module in any optional sequence. At a width of only 12.5 mm per module in connection with modern push-in technology the **REX12** offers no-tool, time-saving and maintenance-free wiring. **This helps to save time and money!**

The patented connection system allows quick and easy removal of individual devices from the group on the rail.

Your benefits when using REX12:

- **Cost-saving** through a flexible and innovative mounting and connection technology without accessories
- **Space-saving** through a small width of only 12.5 mm for two channels
- **Enhanced machine uptime** through protection of the switch mode power supply and improving transparency for trouble-shooting with visual status indication and group signalling

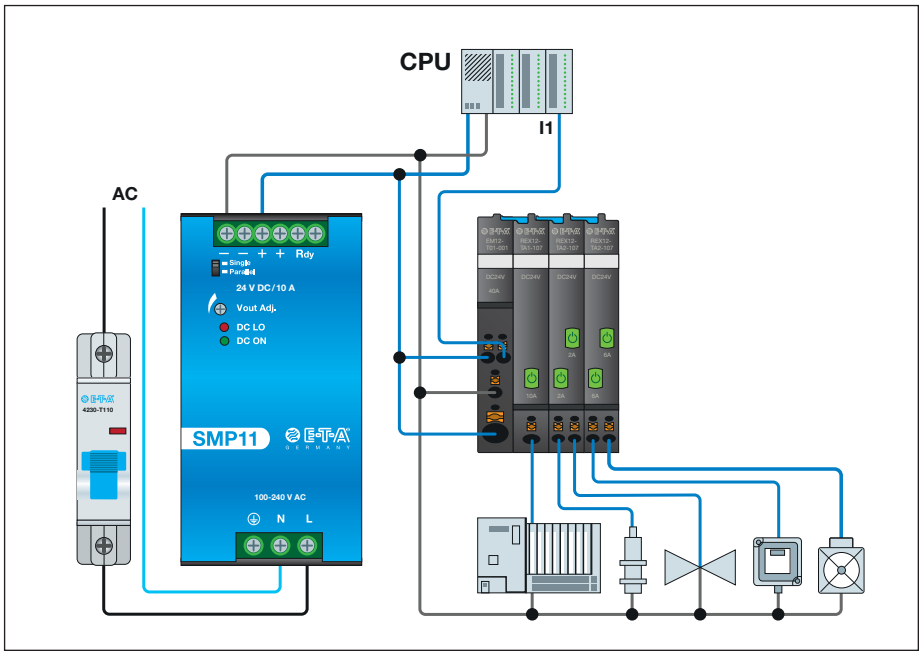
Application in the industries

- Machine construction
- Process control

Cost-effective electronic circuit protector with innovative mounting and connection concept for mechanical engineering: ***REX12***

Cost-optimised electronic overcurrent protection –
REX12 electronic circuit protector

Your »**smart**« DC 24 V protection



The single channel circuit protectors are available in all standard current ratings from 1 A to 10 A. The double channel models are available in the current ratings 2 A, 4 A and 6 A. This helps to protect not only powerful loads, but also sensitive loads and smallest cable cross sections.

Failures can clearly be detected and remedied.

Electronic overcurrent protection

REX12D

- Cost-saving
- Space-saving
- Flexible
- Increases machine uptime

Electronic circuit protector
***REX12D** with IO link connection*

IO-Link

Electronic overcurrent protection
REX12D – cost-effective and smart

IO-link-capable electronic overcurrent protection for the protection of DC 24 V track-mountable systems in single or double channel design with ratings from 1 A to 10 A.

This new product series connects the advantages of side-by-side mounting and the compact design of the **REX12D** series with the properties of a digital, intelligent device with **IO link** connection.

The product group consists of the **EM12D** supply modules with integral **IO link connection.** Designed for DC 24 V and max. 40 A current load. Up to 16 ways overcurrent protection type **REX12D** can be mounted side-by-side as single or double channel devices. The connection to a superordinate **IO link master** transmits comprehensive diagnosis and parameter data. This ensures maximum transparency of your machinery and unrivalled flexibility. The patented connection system allows quick and easy removal of individual devices from the group on the rail.

Your benefits when using REX12D

- **Cost-saving** through a flexible and innovative mounting and connection technology without accessories
- **Space-saving** through a small width of only 12.5 mm for two channels
- **Provides flexibility** through ease of mounting, disassembly, modular design and easy adjustment
- **Increases machine uptime** through protection of the switch mode power supply and through high transparency of the DC 24 V side due to comprehensive diagnostic options via **IO link.**

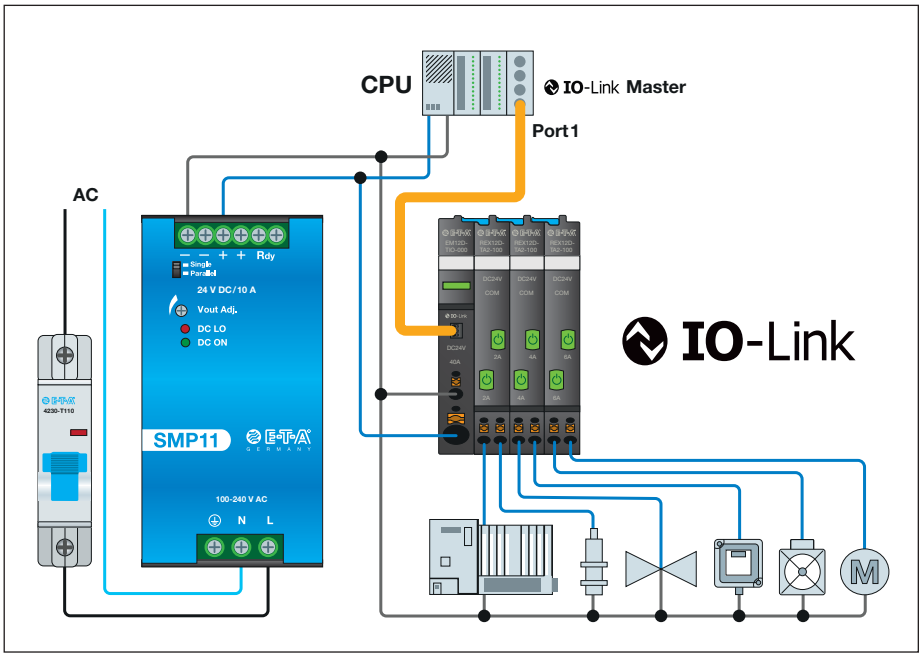
Application in the industries

- Machine construction
- Process control

*Combines electronic overcurrent protection with IO link in mechanical engineering: the **REX12-D** electronic circuit protector*

Electronic overcurrent protection – including IO link:
E-T-A's REX12D

Your »**smart**« DC 24 V protection with IO-Link



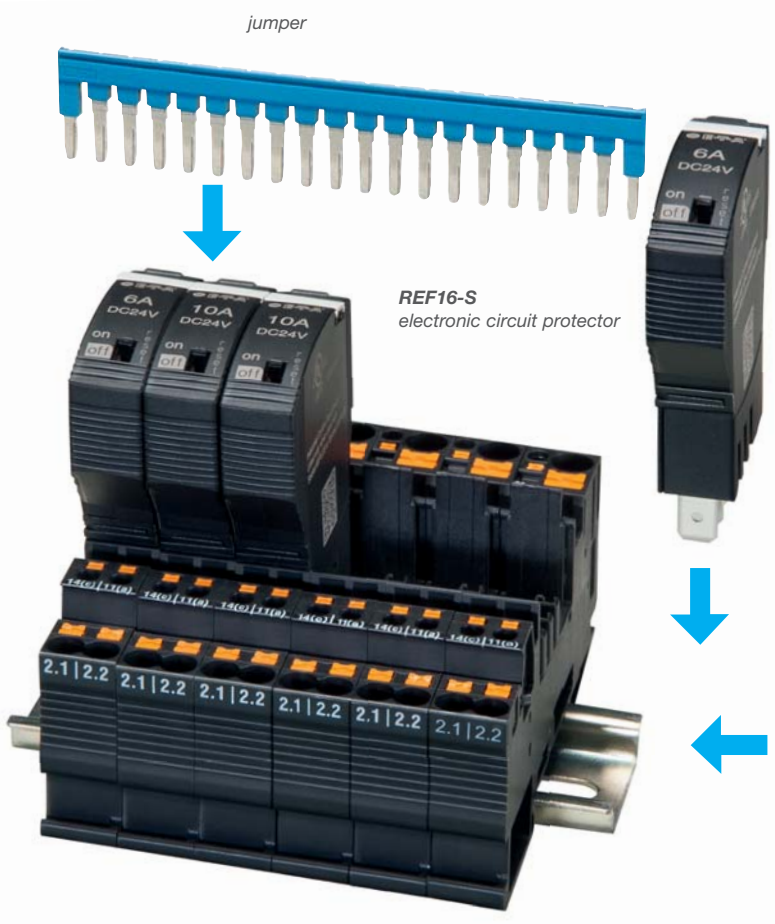
Up to 16 channels of the smart circuit protector **REX12D** can be connected to the port of the superordinate **IO link master** by means of the **EM12D** supply module. The specified standard communication transmits comprehensive diagnostic and parameter data. **This ensures maximum transparency of your machinery and unrivalled flexibility.**

Your DC 24 V protection with IO-Link connection

Electronic overcurrent protection

REF16-S

- Cost-saving
- Flexible
- Reliable



*The electronic circuit protector **REF16-S** offers comprehensive accessories and active current limitation*

Electronic overcurrent protection
REF16-S – the specialist

Current limiting, single-channeled, plug-in type overcurrent protection for the protection of DC 24 V for 0.5 A to 10 A with a terminal block system.

The current limiting device **REF16** ensures that the upstream switch mode power supply is operated in a safe mode due to the limitation to typically 1.25 times rated current. In the event of an overload, the faulty path is disconnected very fast. Inrush current peaks are tolerated by **REF16.**

The connection with the terminal block systems **80plus** and **81plus** allows mounting of the plug-in type devices either in a socket with screw terminals or otherwise with push-in technology. A selection of busbar accessories for further ease of wiring allows easy and flexible connection of the devices and helps to save time and costs.

The in-built coding system increases safety because a mix-up of different current ratings is excluded, a vital feature particularly in plant construction and factory automation. The manual ON/OFF switch on the device itself allows start-up of certain individual load circuits.

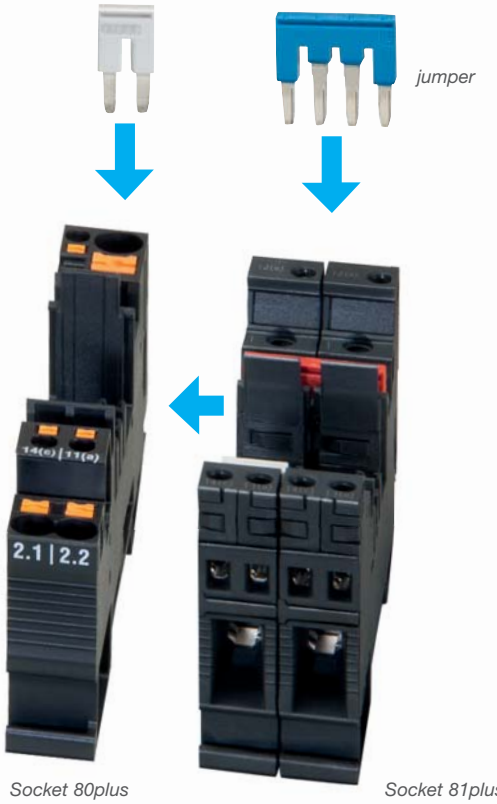
Your benefits when using REF16-S

- Cost-saving because it features ease of wiring and connection via busbars
- Shock and vibration resistant by means of retaining clips and sockets
- Flexible through ease of mounting and disassembly, modular design and convenient adjustment and selection of wiring options
- Ease of coding ensures safe operation and clear assignment of breaker and socket

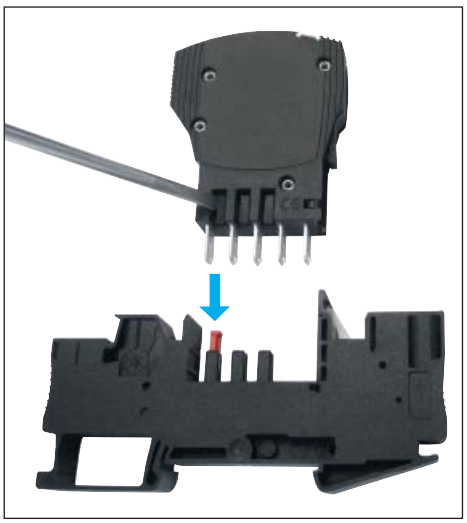
Application in the industries

- Machine construction
- Process control

*Overcurrent protection with active current limitation for machine and panel builders **REF16-S***



Socket 80plus *Socket 81plus*



Coding of circuit breakers and terminal blocks

Terminal block:
insert coding pins in accordance with coding table into receptacles of the sockets.

Circuit breakers:
remove coding pin in accordance with coding table by means of a screw driver

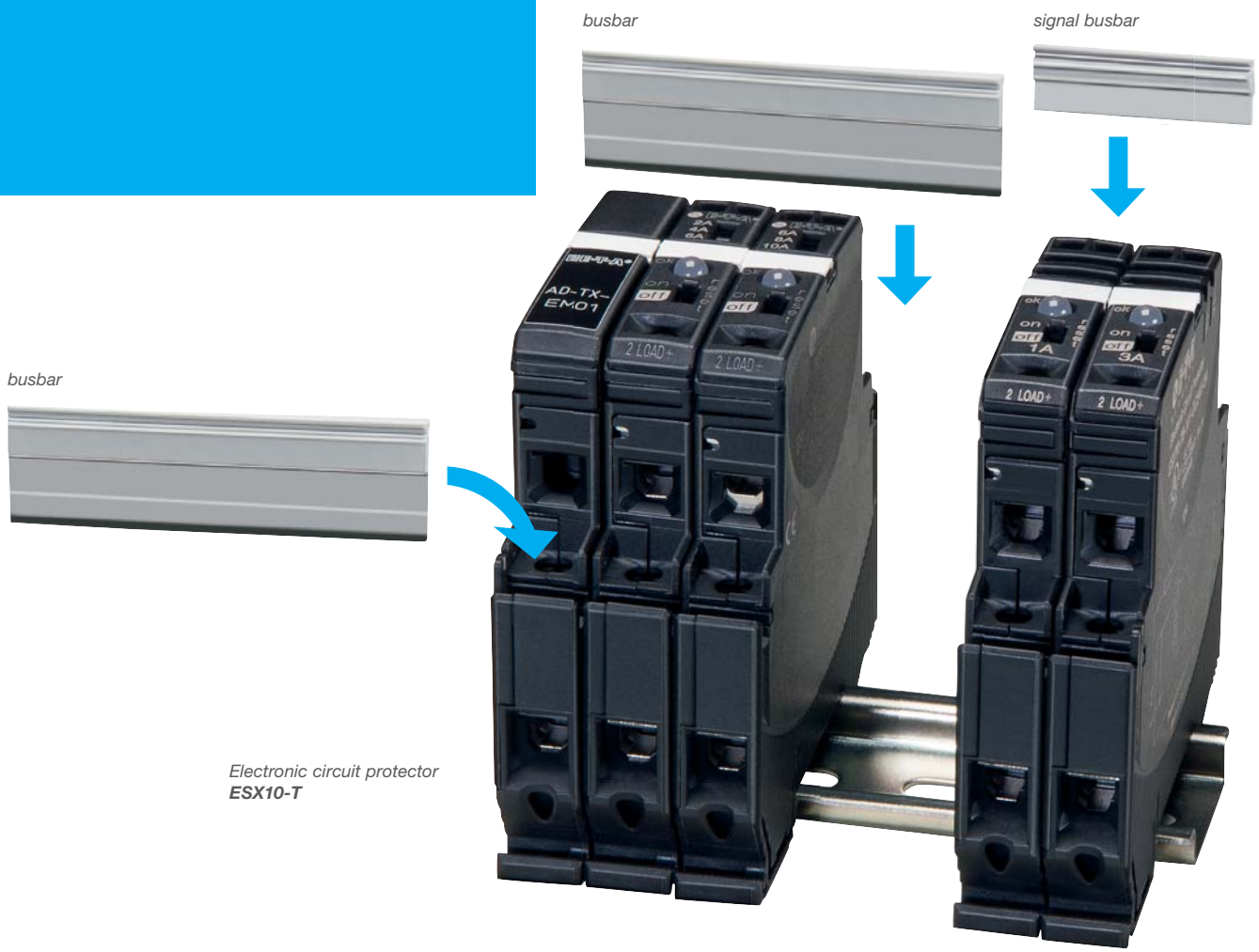
Your benefits:
Coded circuit breakers can no longer be inserted into slots with a smaller rating

Single-channel overcurrent protection with active current limitation: **E-T-A's REF16-S**

Electronic overcurrent protection

ESX10

- Reliability
- Time savings
- Reduction of inventory
- Cost savings



Electronic circuit protector
ESX10-T

Electronic overcurrent protection
ESX10 – a versatile design

Current limiting, single channel track-mountable plug-in type electronic overcurrent protection for DC 12 V and DC 24 V systems with ratings from 0.5 A to 16 A.

The **type ESX10** extends the product group of electronic overcurrent protection for DC 24 V applications by a DC 12 V version and by a 16 A rating. These types are available as rail-mounted version **ESX10-T** or as a plug-in type version **ESX10-S** for the terminal block system **Module 18plus.** In addition there are a number of product versions with fixed current ratings or with adjustable ratings.

The inrush current limitation optimally protects the upstream switch mode power supply. The **ESX10** tolerates inrush peaks of capacitive loads and limits current peaks to typically max. 1.8 x In. In the event of a failure the devices disconnects the faulty path after max. 3 seconds. It increases system availability by means of a selective disconnection.

The **ESX10-TB** version features a sophisticated busbar system and can be wired for LINE and GND as well as signalling. This helps to save time and costs. Particularly for the use in process control there are versions with ATEX approval available.

Your benefits when using ESX10:

- **Safety** of the connected devices and supply feeds through selectivity and current limitation within the device
- **Time savings** through quick and easy wiring by means of busbars for LINE/0 V and plug-in jumpers for auxiliary contact
- **Stock reduction** by using devices with adjustable current ratings
- **Cost reduction** through reduced wiring time as well as through stock reduction and less inventory space

Application in the industries

- Machine construction
- Process control

*In many versions and for many applications in factory automation: the **ESX10** circuit protector.*

*Electronic circuit protector **ESX10** suitable for terminal block system **Module 18plus** and **Module 17plus***

Versatile electronic circuit protector:
E-T-A's ESX10

Electronic overcurrent protection

ESS30-S
ESS31-T

- Reliability
- Space savings
- Energy savings

Electronic circuit breaker ***ESS30-S*** *on* ***Module 18plus***

Electronic overcurrent protection
ESS30-S and ESS31-T – for physical isolation

ESS30-S: Current limiting plug-in type overcurrent protection with physical isolation for the protection of DC 24 V with ratings from 0.5 A to 10 A

The **ESS30-S** type unites the current limiting properties of a conventional electronic overcurrent protection with the physical isolation of contacts. This is achieved by including a bimetal with its inherent thermal trip mechanism.

The unit can be plugged into the terminal block system **Module 18plus** and requires up to 40% less quiescent current than comparable products. This makes the **ESS30-S** ideally suited for decentralised power distribution in factory automation, process control and in the production area of the automotive industry.

ESS31-T: Current-limiting overcurrent protection for rail mounting with physical isolation for the protection of DC 24 V devices with ratings from 0.5 A to 12 A. The **ESS31-T** combines conventional electronic overcurrent protection with current limitation and the physical isolation by means of a bimetal.

Its track-mountability makes the **ESS31-T** suitable for versatile use in applications where physical isolation is imperative. This includes mechanical engineering, the chemical, pharmaceutical and food-stuffs industry.

Your benefits when using ESS30-S:

- **Safety** of the connected devices and supply feeds through selectivity and current limitation within the device plus physical isolation of the circuit
- **Low Energy Breaker** with 30 % reduction of power loss compared to competitive product

Your benefits when using ESS31-T:

- **Safety** of the connected devices and supply feeds through selectivity and current limitation within the device plus physical isolation of the circuit

Application in the industries

- Machine and plant construction, particularly car production
- Process control in the oil and gas industry, in the foodstuffs and pharmaceutical industry
- Power Engineering

*If you require physical isolation in your protection concept, we recommend the electronic circuit breakers **ESS30-S** and **ESS31-T.***

Electronic circuit breaker
ESS30-S

Electronic circuit breaker
ESS31-T

Electronic circuit breakers including physical isolation
E-T-A's ESS30-S and ESS31-T

Electronic overcurrent protection

ESX50D

- Enhanced system transparency
- Increased availability
- More flexibility, less costs

*Electronic circuit protector **ESX50D***

*Power distribution system **SVS201** fitted with electronic circuit protector **ESX50D***

Electronic overcurrent protection
ESX50D – capable of communication

Plug-in type electronic circuit protector, capable of communication with current limitation, for the use in DC 24 V applications with adjustable current ratings between 1 A and 10 A

The **ESX50D** has been designed for the use in the power distribution board **SVS201** for connection by means of the internal communication bus ELBus® with a bus controller **CPCP10.** Communication of devices, parameterisation and diagnoses are via the ELBus® to the **CPCP10.** From there the connection is possible by means of field bus connections such as PROFIBUS or PROFINET to the superordinate control unit.

Thus the **ESX50D** unites the properties of a current limiting electronic overcurrent protection with those of a fully parameterisable and adjustable device. This allows comprehensive monitoring of the load conditions and, inherent, the diagnosis of the devices. It creates unrivalled transparency of the DC 24 V load situation and significantly increases system availability. This is particularly important for critical industrial branches including chemical, foodstuffs and pharmaceutical.

Your benefits when using ESX50D:

- **Enhanced** system transparency by the option to read out and analyse all the operating conditions of the DC 24 V side.
- **Increased** system availability through the possibility to analyse and evaluate and the resulting options of condition monitoring and fast trouble-shooting.
- **Flexibility** provided by the use of adjustable devices by means of hardware or even software. This also saves inventory costs.

Application in the industries

- Machine and plant construction, particularly car production
- Factory automation, e.g. car production
- Chemical industry, food & pharma, oil & gas

*Intelligent protection with comprehensive communication capabilities offered by the **ESX50D**, e.g. for process control.*

Electronic overcurrent protection – including communication:
E-T-A's ESX50D

Electronic circuit breaker AC 230 V

EBU

- Increased system availability
- Cost savings
- Planning made easy

Electronic circuit breaker ***EBU***

Electronic circuit breaker AC 230 V
EBU – saving your UPS

Mechatronic circuit breaker for selective overcurrent protection of AC 230 V UPS systems.

The **EBU** consists of an MCB approved for short circuit interruptions up to 10 kA. The second element is an add-on electronic circuitry for measuring and evaluation tasks. The product is available with the typical MCB ratings 6 A, 10 A and 16 A with B and C characteristics and is directly operated at the output of the corresponding UPS.

Uninterruptible power supplies only provide a limited current in the event of a short circuit. The current provided by the UPS is not sufficient to trip a thermal-magnetic overcurrent circuit breaker. Thus - in the event of a failure - the entire UPS system will be disconnected.

The **EBU** type can be adjusted to the actual load conditions and the capability of the UPS unit in question by means of two selector switches. The device will reliably trip in the event of a failure. And only the load path concerned will be disconnected. All other supply strings will remain unaffected.

Your benefits when using EBU:

- **Enhanced system availability** through effective protection
- **Reduction of overall costs** by a 1/3 more efficient rating
- **Ease of planning** through variable overcurrent protection.

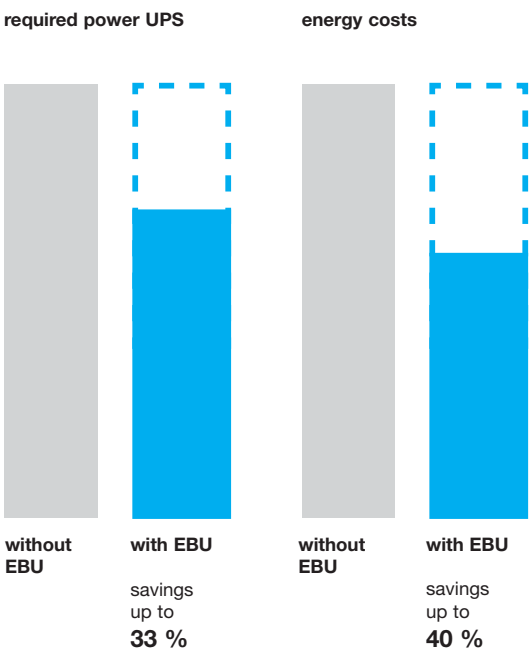
Application in the industries

- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

*Increases your system availability: Electronic Breaker Unit **EBU***

Reduction of overall costs by a 30% more efficient rating

Type **EBU** allows UPS systems to be designed by 1/3 smaller. Annual energy costs are thus reduced by approx. 40 percent. In addition the smaller system also requires less space.



Overview
Electronic overcurrent protection

Type	ESS30-S	ESS31-T	ESX10-S	ESX10-TA	ESX10-TE
					
Voltage ranges					
Voltage ratings	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Operating voltage	18-30 V DC	18-30 V DC	18-32 V DC	18-32 V DC	18-32 V DC
Ratings					
Fixed	●	●	●	●	●
Adjustable	●		●		
Min. value	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
Max. value	10 A	12 A	12 A	12 A	16 A
Min. grading	1 A	1 A	1 A	1 A	1 A
Number of					
Channels	1	1	1	1	1
Manual ON/OFF/reset:					
Push button	●	●			
Slide switch					
General data					
Electronic disconnection	●	●	●	●	●
Physical isolation	●	●			
Overload factor	1.2 x I_N	1.2 x I_N	1.2 x I_N	1.1 x I_N	1.1 x I_N
Overload trip time	500 ms	500 ms	3 s	3 s	3 s
Short circuit current	1.2 x I_N	1.2 x I_N	1.4 x I_N	1.8 x I_N	1.8 x I_N
Short circuit trip time	100 - 500 ms	100 - 500 ms	100 ms-3 s	100 ms-3 s	100 ms-3 s
Capacitive load	40,000 µF	40,000 µF	40,000 µF	75,000 µF	75,000 µF
Signalling					
Make contact	●	●	●		●
Break contact	●	●			●
Change-over contact	●		●		
Status output			●		●
Input remote ON/OFF			●		●
Input remote reset			●		●
Busbar IN/GND		●		●	●
Signal busbar					●
Mounting method					
Module 18plus	●		●		
Module 17plus	●	●	●		
Socket 80/81plus					
SVS	●	●	●		
Symmetrical rail	●	●	●	●	●
Terminal design					
Spring-loaded terminals	●	●	●		
Screw terminals				●	●

	ESX10-TD	REF16-S	ESS22-T	REX12-T	REX12D-T:	ESX50-D
						
	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
	18-32 V DC	18-30 V DC	18-32 V DC	18-30 V DC	18-30 V DC	18-32 V DC
		●	●	●	●	●
	●					
	0.5 A	0.5 A	0.5 A	1 A	1 A	0.5 A
	10 A	10 A	10 A	10 A	10 A	10 A
	in steps	1 A	1 A	1 A	1 A	1 A
	1	1	2	1/2	1/2	1
				●	●	
	●	●	●	●	●	●
			●			●
	1.1 x I_N	1.25 x I_N	1.1 x I_N	1.1 x I_N	1.1 x I_N	1.2 x I_N
	3 s	130-800 s	3 s	3 s	3 s	3 s
	1.4 x I_N	1.25 x I_N	1.4 x I_N	1.4 x I_N	1.4 x I_N	1.4 x I_N
	100 ms-3 s	100-800 ms	100 ms-3 s	2 ms-3 s	2 ms-3 s	100 ms-3 s
	75,000 µF	20,000 µF	20,000 µF	20,000 µF	20,000 µF	20,000 µF
	●	●	●	●	●	●
	●	●	●			●
	●	●		●	●	
	●	●	●		●	●
					●	
	●			●	●	
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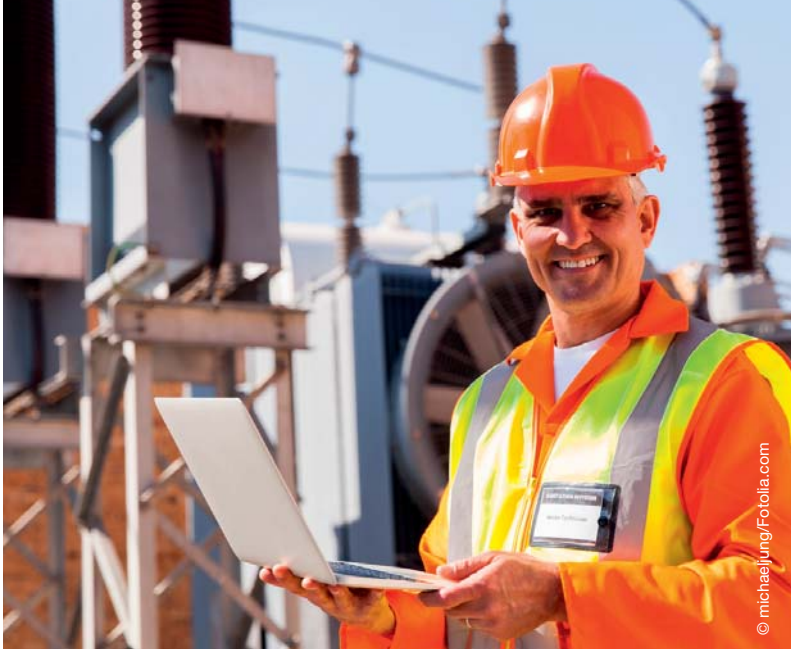
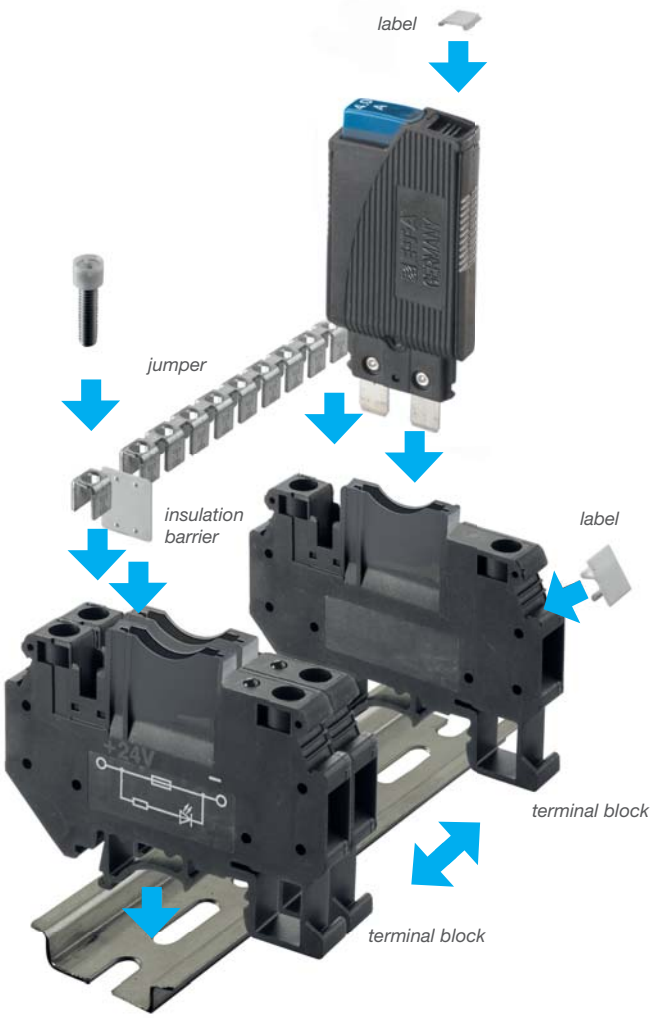
Fuse replacement

1180



- Flexible
- Modular
- Cost-saving
- Enhanced system availability

*Thermal circuit breaker **1180***



Fuse replacement
1180 – small, but clever

Single pole, plug-in type thermal circuit breaker in a compact design with an optional switching function for the use at AC 250 V and DC 65 V with ratings from 0.1 A to 10 A.

The thermal circuit breaker **1180** has been designed as a fuse replacement for all applications where the resettability can make the replacement of a blown blade fuse unnecessary. It features a reliable switching behaviour, a powerful snap action mechanism and is positively trip-free.

The 1180 offers a pluggable solution together with the pertinent terminal blocks for rail mounting. A wealth of accessories such as busbars, insulation barriers and jumpers is available for quick and easy wiring of LINE and GND. This helps to saves time and costs. Used for the protection of loads in power distribution systems in control cabinets and plant engineering and construction.

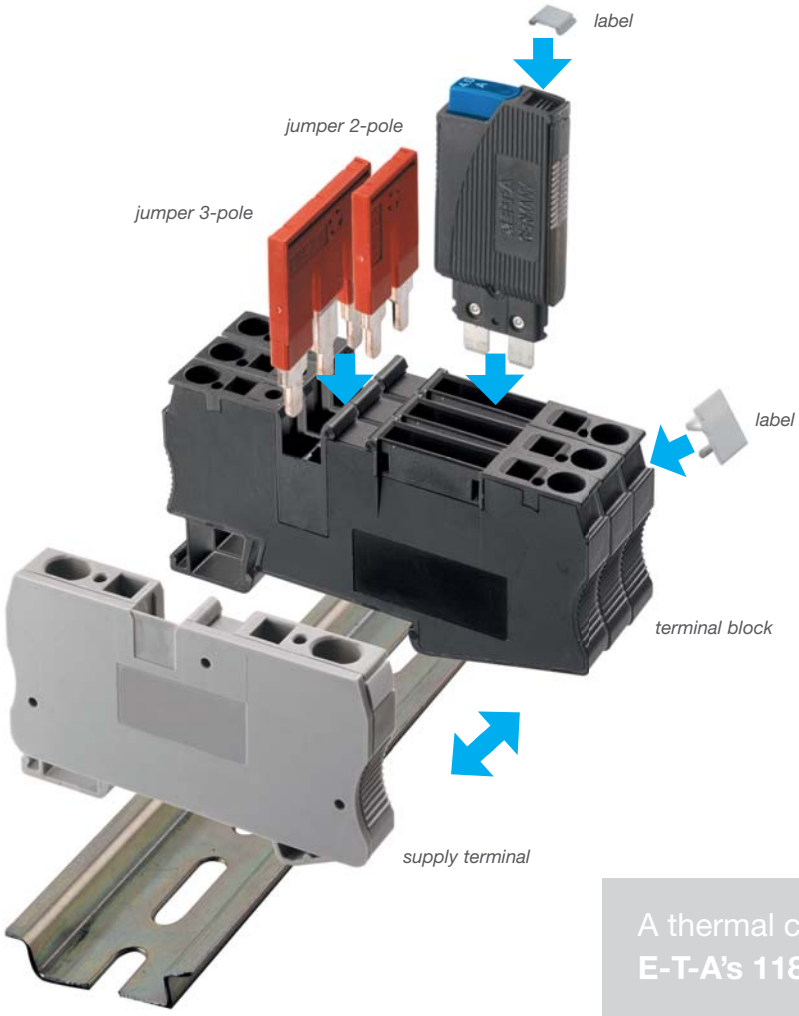
Your benefits when using 1180:

- **Flexibility** through plug-in design
- **Modularity** through the use of various components and wiring modules
- **Cost reduction** through artless electrical design, quick wiring,
- **Increased** system availability through resettability by means of a push button. Never search for replacement fuses again!

Application in the industries

- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

*Compact and clever for the chemical industry: circuit breaker type **1180***



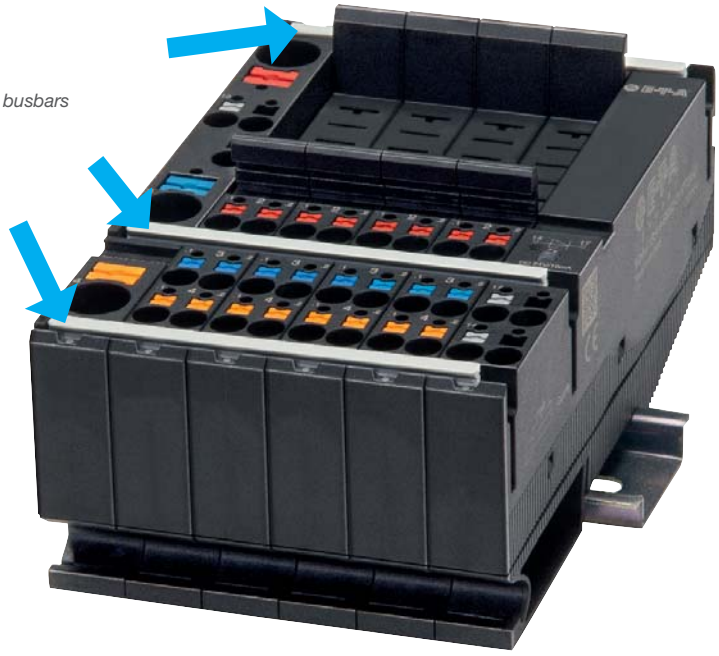
A thermal circuit breaker with many functions:
E-T-A's 1180

Power distribution system

Module 18plus

- Flexible
- Modular
- Cost-saving

busbars



***Module 18plus** power distribution system*

18plus-EM supply module
terminal 1 (LINE +), terminal 3 (0 V), terminal 4 (FE)
terminal 13 (aux. contact input)

18plus-AM connection module
terminal 2.1/2.2 (LINE +),
terminal 3.1/3.2 (0 V),
terminal 4.1/4.2 (FE)

Power distribution system
Module 18plus – a flexible design

Terminal block system for the use in DC 24 V applications for optimum wiring of the plug-in type E-T-A circuit breakers.

It is the ideal solution for decentralised systems in automation technology and control technology, accommodating plug-in type circuit breakers. Besides accommodating a comprehensive range of electronic overcurrent protection devices such as **ESX10-S and ESS30-S** it is also suitable for conventional thermal or thermal-magnetic circuit breakers such as the **2210-S** .

The **Module 18plus** holds an entire mounting and power distribution system for DIN rail mounting. Together with the pertinent busbars it provides a fully fledged 80 A potential distribution of the DC 24 V control voltage. No additional connection terminals or connection lines are required.

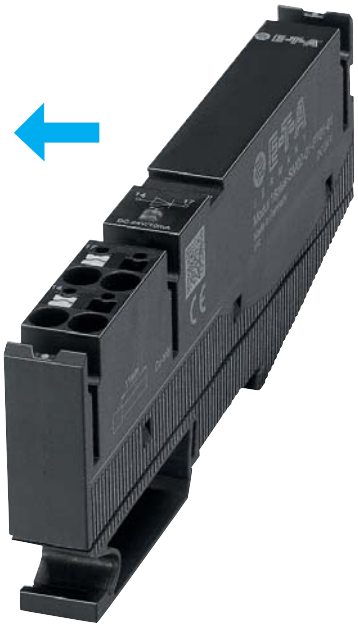
Your benefits when using Module 18plus

- **Flexibility** through modules that can be mounted side by side and a great number of plug-in type circuit breakers including the thermal-magnetic circuit breaker **2210-S** and the electronic circuit protection **ESS30, ESX10** or the intelligent circuit protector **ESX50D.**
- **Modularity** through various functional sub-assemblies for conventional power distribution and also for intelligent ***ControlPlex***® systems
- **Cost savings** through artless electrical design, quick wiring and low stocks

Application in the industries

- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

Ideally suited for the use with plug-in type E-T-A circuit breakers:**E-T-A's Module 18plus**



18plus-SM signalling module
terminal 14 (aux. contact output)
terminal 17 (GND for integral
base load 10 mA with LED display)

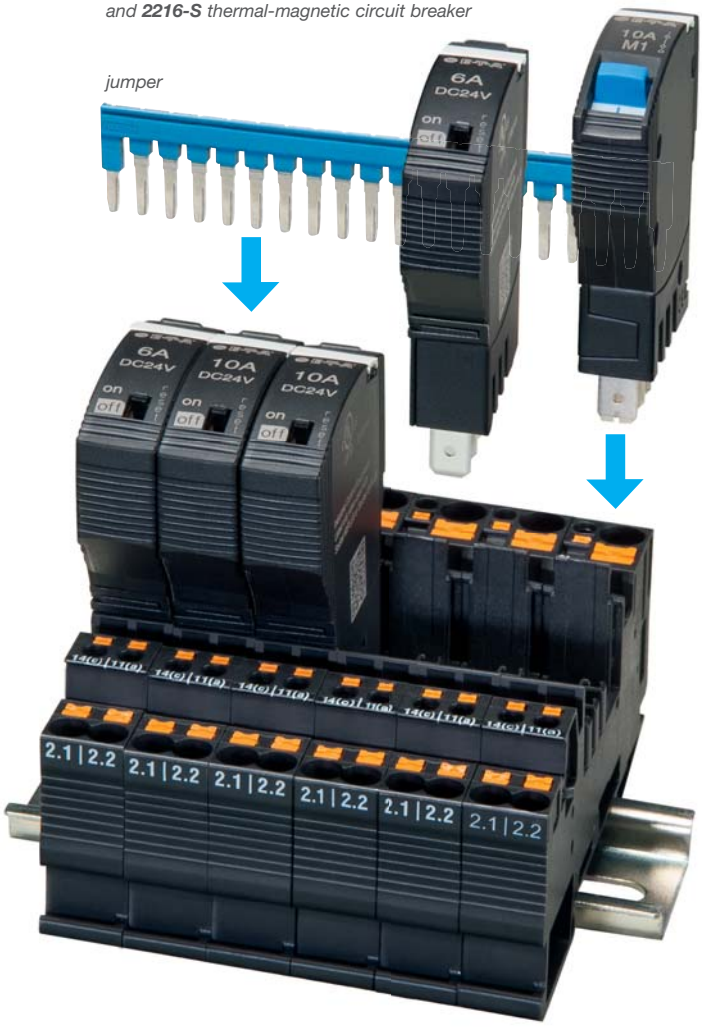
Power distribution system ***Module 18plus*** *fitted with* ***ESS30-S, ESX10-S*** *and* ***2210-S***

Socket systems

80plus
81plus

- Flexible
- Reliable
- Cost-saving

REF16-S *electronic circuit protector*
and ***2216-S*** *thermal-magnetic circuit breaker*



Socket systems
80plus and 81plus – reliable flexibility

Socket systems for the use in DC 24 V applications for the ideal wiring of the electronic circuit protector REF16-S and the thermal-magnetic circuit breakers 2216-S.

The socket systems **80plus** and **81plus** offer a choice between screw terminals **(81plus)** and modern push-in technology **(80plus).** For both versions we offer a comprehensive programme of wiring solutions. They include busbars and jumpers for quick and easy wiring. **This helps to save time and costs.**

Particularly in process automation and decentralised plant engineering and construction, the integral coding system provides a reliable assignment of current ratings and sockets. This significantly increases system safety. The socket systems have an integral retaining clip which reliably latches on in the socket when plugging in and thus offers a very high vibration resistance.

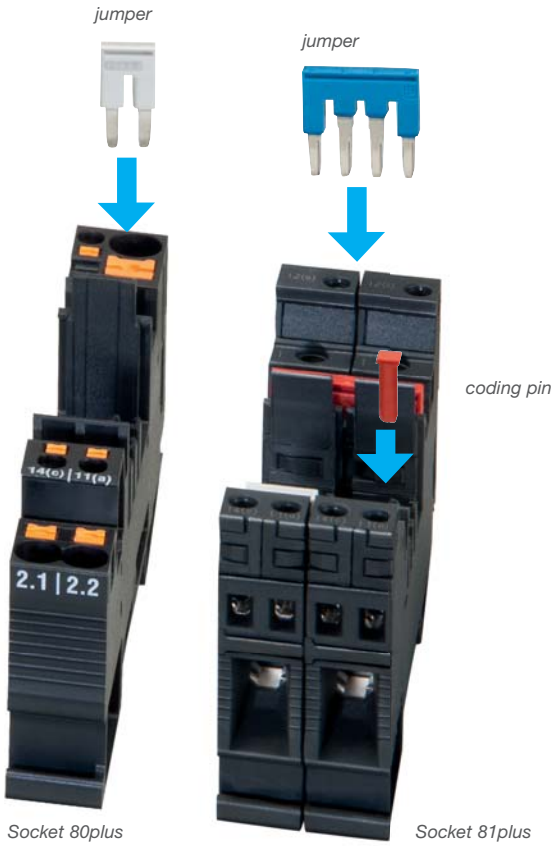
Your benefits when using 80plus and 81plus:

- **Flexibility** through modules to be mounted side by side with plug-in type electronic or thermal-magnetic protection devices.
- **Safety** provided by an in-built coding system and integral retainig clip for a firm and reliable latch-on.
- **Cost savings** through artless electrical design, quick wiring and low stocks

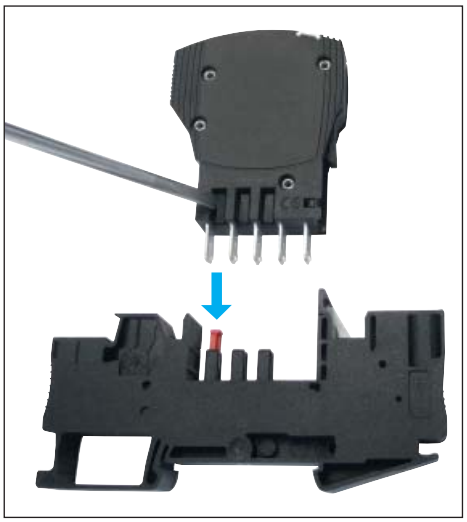
Application in the industries

- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

*Also suitable for the steel industry: the socket systems **80plus** and **81plus***



Socket 80plus *Socket 81plus*



Coding of circuit breakers and terminal blocks

Terminal block:
insert coding pins in accordance with coding table into receptacles of the sockets.

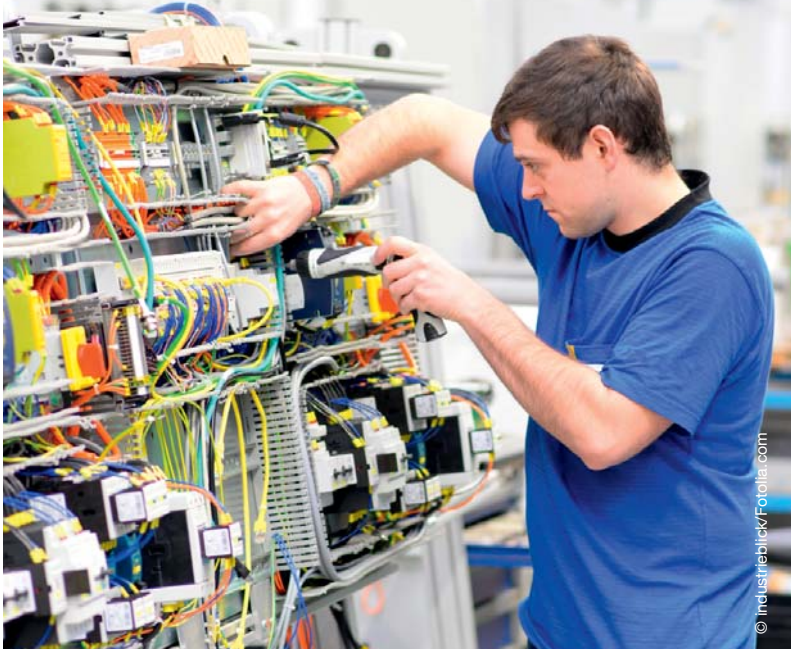
Circuit breakers:
remove coding pin in accordance with coding table by means of a screw driver

Your benefits:
Coded circuit breakers can no longer be inserted into slots with a smaller rating

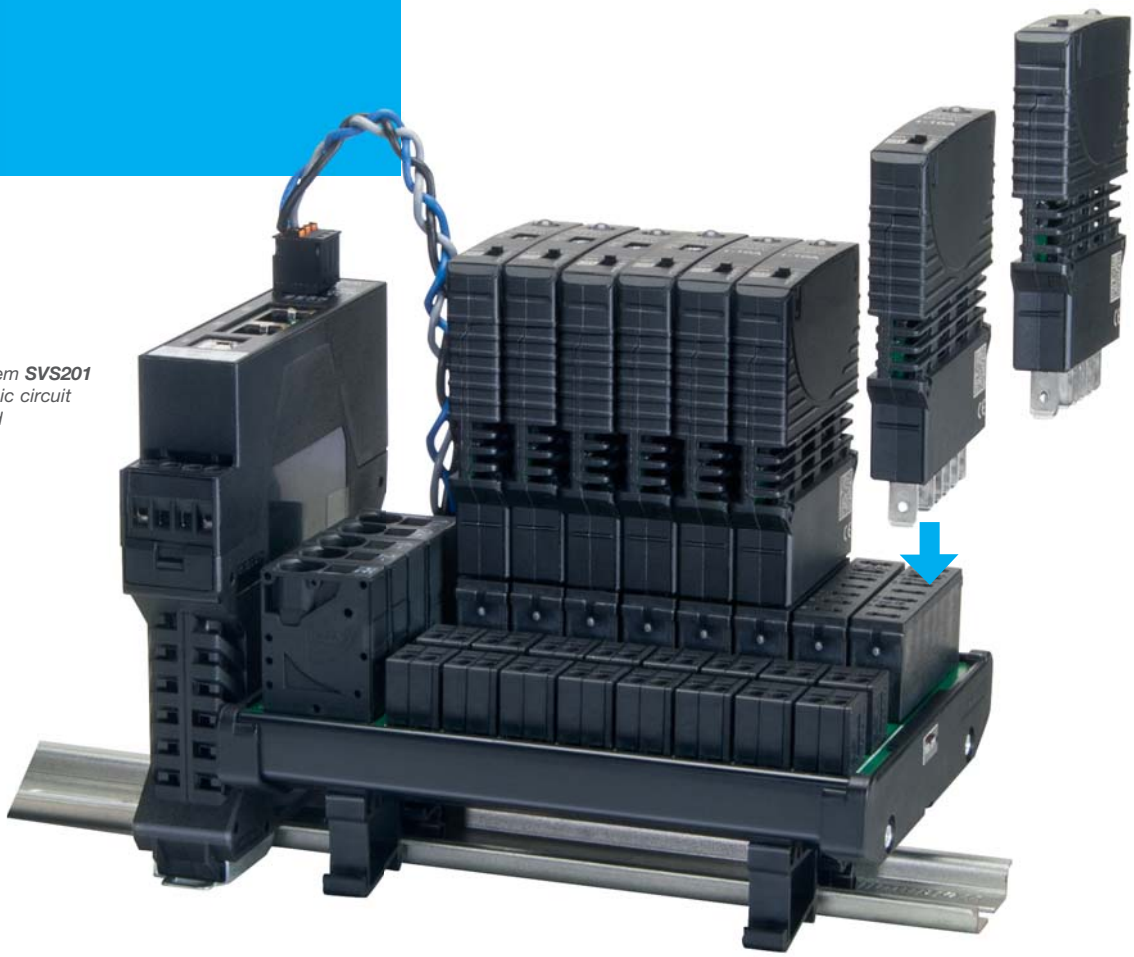
Customised terminal blocks for REF16-S and 2216-S:
E-T-A's 80plus and 81plus sockets

Power distribution system

ControlPlex® Board



- Increased system availability
- Modular
- Cost-saving



*Power distribution system **SVS201** populated with electronic circuit protectors **ESX50D** and Bus controller **CPC10***

Power distribution system
ControlPlex® Board – a smart system

Power distribution system as a combination of field bus connection technology combined with electronic, current limiting overcurrent protection devices.

This power distribution system is used anywhere where high system transparency and integration of the DC 24 V load side into the control level are of the essence. This is the case for instance in process automation.

The system consists of the power distribution board **SVS201**, with 8, 16 or 24 slots. It offers the possibility of multiple load and GND connection on the load side. It is combined with the plug-in type electronic overcurrent protection **ESX50D.** This protector is parameterisable, features adjustable current ratings and is readable. The bus connection to PROFIBUS or PROFINET is by means of the bus controller **CPC10.** The module **CPC10** can address up to four power distribution boards. It allows evaluation of up to 96 circuit protectors.

Your benefits when using *ControlPlex*® Board:

- **High system availability** through high transparency on the DC 24 V load side provided by ease of trouble-shooting and diagnostics, but also through continued load monitoring.
- **Modularity** through selectable sizes such as 8, 6, 24 slots, extendable to four power distribution boards.
- **Cost savings** through artless electrical design, quick wiring, multiple load connection and reduced inventory as no additional terminals are required.

Application in the industries

- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

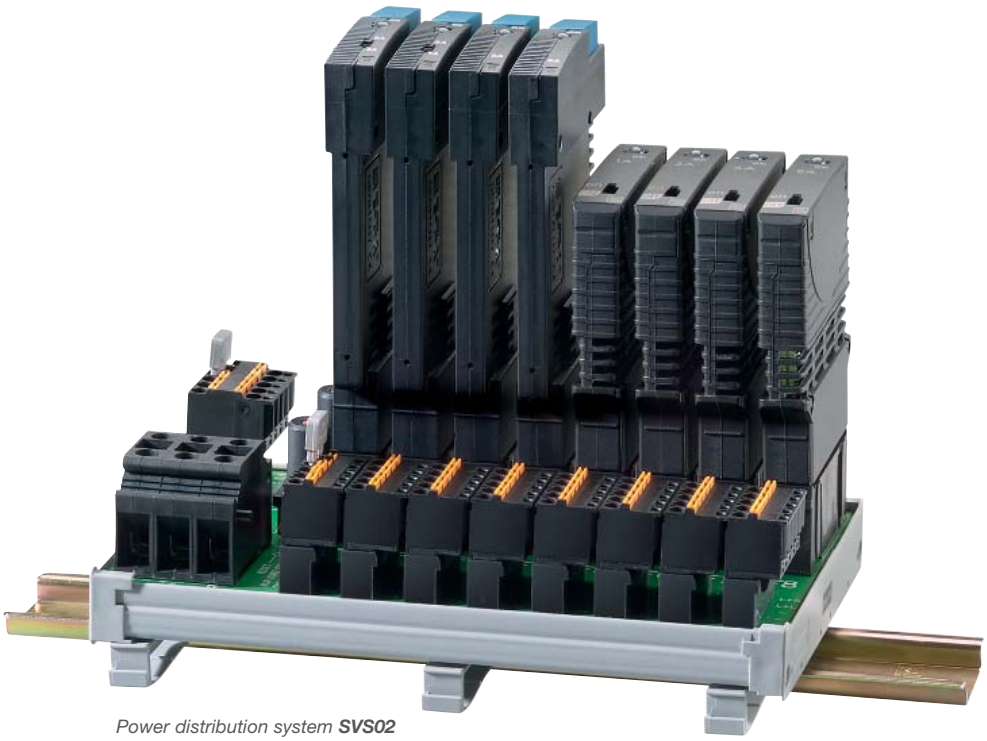
Intelligent power distribution for complex applications: ***ControlPlex® Board***

ControlPlex® Views allows quick access to all components of ***ControlPlex***® Board during start-up or service. This is made possible via the USB service interface. This function ensures that parameterisation and control of the individual components work even without connection to a superordinate PLC.

Terminal blocks and power distribution systems

SVS

- Tailor-made
- Cost-saving



Power distribution system ***SVS02***

Power distribution boards
SVS – a customised solution

Customer-specific power distribution boards which can meet the customer's requirements regarding special wiring methods and which can also be ordered in smaller quantities.

The power distribution systems of the **SVS series** allow E-T-A to individually respond to specific customer requirements. By means of comprehensive engineering and production options we are able to implement tailor-made wiring solutions within the shortest of times. Based on plug-in type circuit breakers for equipment protection and standard components for wiring solutions we created individually designed versions in any lot size.

No matter which number of slots is required or which kind of signalling (individual, group, split-up group signalling) - E-T-A is able to offer solutions tailored to your needs. The same goes for terminals or the number of load outputs for LOAD/GND or even for field bus connections.

We already have a great number of existing solutions and beyond that we are pleased to work with you on the proper version for your specific application.

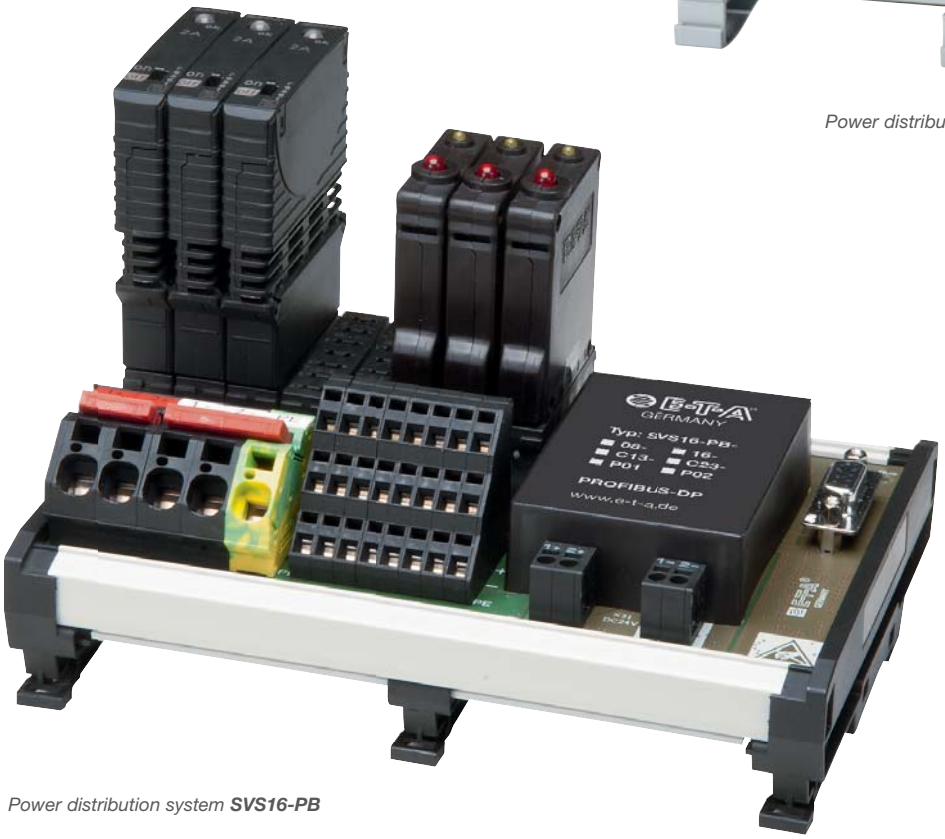
Your benefits when using SVS systems:

- **Tailor-made solution** for the customer-specific application and thus the precise adjustment to the requirements.
- **Cost savings** through artless electrical design, quick wiring and low stocks

Application in the industries

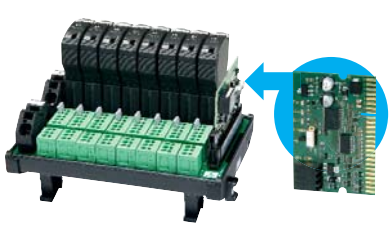
- Factory automation, e.g. car production
- Chemical Industry, food & pharma, oil & gas
- Power plants
- Steel industry

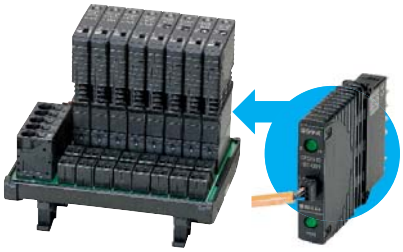
*Power distribution system **SVS09***



*Power distribution system **SVS16-PB***

Overview
ControlPlex®

Basic module or unit	SVS24-08-001	SVS16-xx	RE
interface module	SIGMO-24-001	integral	/ E
			
Electronic circuit protectors			
REF16-S114	●		
ESX10		●	
ESX10-S		●	
REX12D-T			
ESX50D-S100 (80)			
ESX50D-S110			
Solid state relays			
E-1048-7xx		●	
Interfaces			
IO-Connect (3 wire)	●		
PROFIBUS-DP (PB)		●	
PROFINET (PN)		under preparation	
EtherNet/IP (EN)		under preparation	
EtherCAT (EC)		under preparation	
Modbus TCP (MB)		under preparation	
IO link			
USB			
Slots/max. no.			
Max. 8	●	●	
Max.16		●	
Max. 24			
User software			
CP tools			
CP views (USB)			
Status / cyclical			
ON / OFF / error	●	●	
Wire break		● E-1048-7xx	
Load output ON/OFF			
Short circuit / overload			
Overvoltage/undervoltage			ur
Excess temperature			
Limit value current			
Event			
Control / cyclical			
ON/OFF / reset	●	●	
Release (prerequisite for function *1)			
Load output ON/OFF (*1)			
Reset (*1)			
Measuring values			
Load current			
Load voltage			n

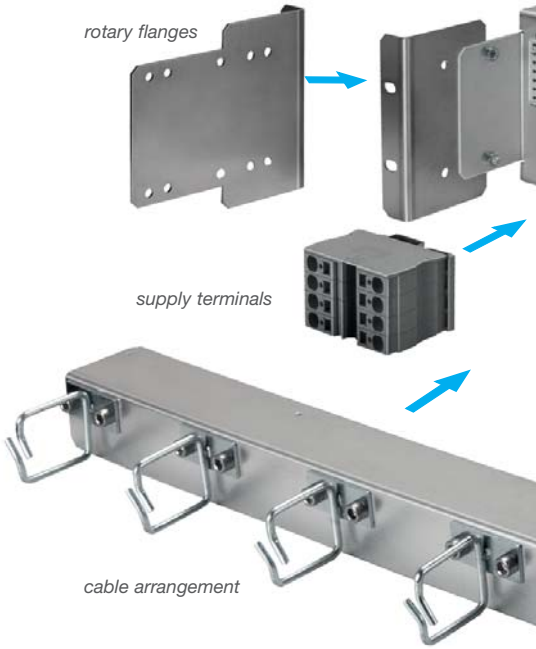
X12D-T:	SVS201-PWR	SVS201-PWR	SVS201-PWR
M12D-T..	CPC10IO-S1	CPC10Px-T1	CPC10Px-T4
			
●			
	●	●	●
	●	●	●
		●	●
		●	●
●	●	●	●
		●	●
	●	●	● (4x)
●	●	●	● (4x)
	●	●	● (4x)
●	●	●	●
		●	●
●	●	●	●
●	●	●	●
ndervoltage	●	●	●
	●	●	●
●	●	●	●
●	●	●	●
		●	●
●	●	●	●
●	●	●	●
cyclical	cyclical	cyclical	cyclical
on-cyclical	non-cyclical	cyclical	non-cyclical

System Engineering – a flexible concept

System technology

- Optimally matched components
- Comprehensive solutions requiring no preparatory work
- Cost-saving
- Wide application range

Decentralised power distribution unit DC 24 V



Centralised and decentralised power distribution systems
Flexible system technology

Power distribution systems for an optimised power distribution in line with the protection elements. Selective overcurrent protection and intelligent signalling on pcb basis are included.

A wealth of possibilities

Power-D-Box® and Power Distribution Module in a 19“ design can entirely be tailored to customers’ needs. According to the »plug and play« principle, they only have to be connected.

An entire control cabinet accommodating the power distribution even more compactly, requiring even less space, placed decentrally on site beside the machine, e.g. designed as a so-called ***BonsaiCabinet®*** – or as a centralised high current control cabinet solution. Our application experts ensure practice-oriented knowledge and guidance and will work out an individual protection concept - straight from the construction kit. This implies ultimate technical and economic advantages.

Technical design

The system solutions are designed for the following voltage levels:

- AC 230 V, AC 400 V
- DC 24 V, DC 48 V, DC 400 V

at almost any current rating.

The system solutions of our series ***Power-D-Box®*** and Power Distribution Module enable a compact power distribution, where the aspects safety, clear layout and space-saving design as well as redundancy and selectivity are our major requirements. The modular design allows flexible, reliable and easy extension of our power distribution systems.

Other parts of our power distribution systems are back-up fuses which are fitted in the supply modules. In addition they feature a reliable, selective DC 24 V protection with electronic circuit protectors, modular design to increase the number of ways and a clearly laid-out cable management. Do you have additional requirements?

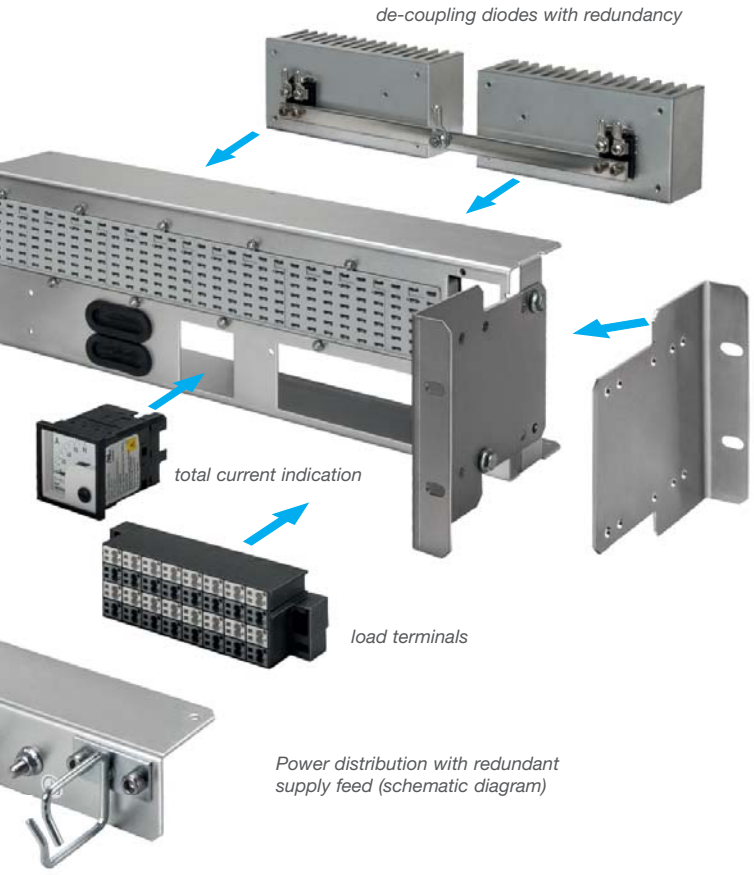
Our experts shall be pleased to design a tailor-made solution for you.

Your benefits

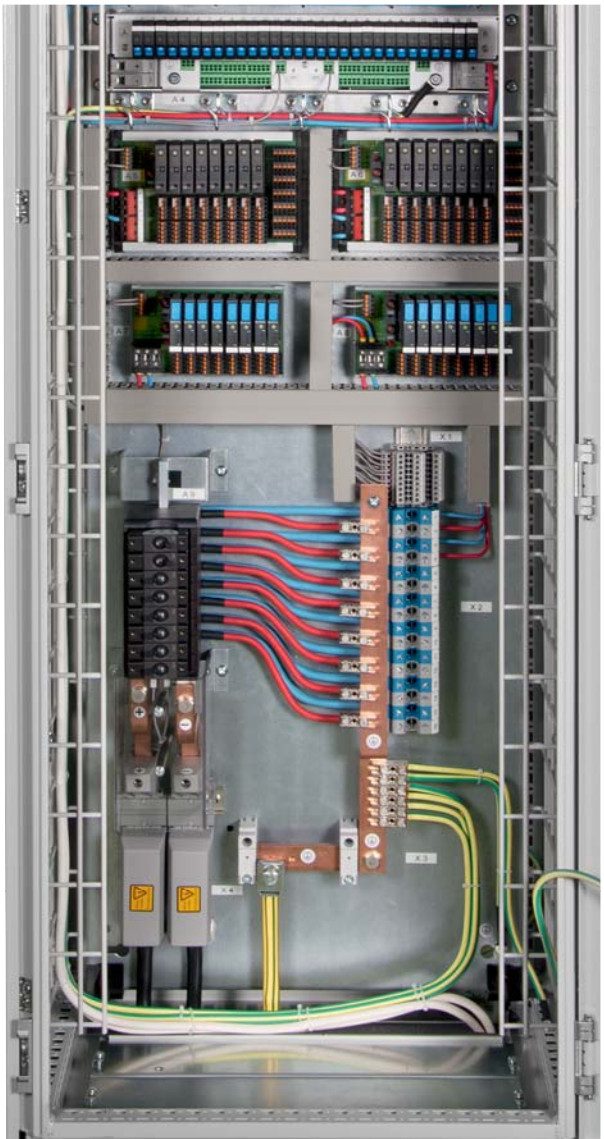
- You will receive the requested product much faster
- No time-consuming tests required, all components are optimally co-ordinated
- No preparatory works required, because E-T-A solutions are complete

Application in the industries

- Chemical Industry, food & pharma, oil & gas
- Power grid operators or power plants
- Car production, factory automation in the automotive industry



Power distribution with redundant supply feed (schematic diagram)



Technical Information

- Basic information and application examples

Thermal overcurrent circuit breaker (TO)
The trip time of thermal circuit breakers depends on the height and duration of the overload current. The higher the overcurrent, the faster the bimetal will reach its defined tripping temperature. In the event of a low overload it will take longer until the required disconnection of potentials takes place. Thermal circuit breakers can be recommended for all applications where an overload can be expected. They are the ideal solution for protecting loads such as motors, transformers, magnetic valves, on-board electrical systems and low voltage lines.

Thermal-magnetic circuit breakers (TM)
The protective function of thermal-magnetic circuit breakers is achieved by the combination of temperature and magnetic force. The thermal element of the circuit breakers provides protection in the event of an overload with a delayed trip characteristic. The magnetic part responds without delay to high overload and short circuit currents and disconnects the faulty circuit within only a few milliseconds. These circuit breakers are well suited for telecommunications, process control and similar applications requiring precision performance.

Magnetic circuit breakers (MO)
Circuit breakers with a magnetic trip characteristic trip extremely fast. In the event of a short circuit the faulty circuit will be interrupted nearly without delay. The magnetic system of the breaker is the sole tripping element. As tripping depends on the time curve of the magnetic force and thus also on the magnetic field, the trip limit is influenced by the shape of the current characteristic (AC/DC). Magnetic circuit breakers are largely unsusceptible to temperature fluctuations. This operating principle is ideally suited to protect any application with a higher risk of short circuit.

Hydraulic-magnetic circuit breakers (HM)
A well-proven design of solenoid coil with optional hydraulic delay provides tripping that is highly tolerant to changes in ambient temperature. A wide range of performance characteristics is available in single, double and three pole configurations. The magnetic part responds without delay to high overload and short circuit currents and disconnects the faulty circuit within only a few milliseconds.

Electronic overcurrent protection
With electronic overcurrent protection the load current is measured with an integral current sensor. In the event of an overload the circuit will be interrupted after approx. 5 sec even with cable attenuation. In the event of a short circuit in the load circuit, the overcurrent will be limited electrically and then disconnected. This will prevent a voltage dip in the power supply. An electronic circuit breaker will also physically isolate the load circuit in the event of an overcurrent.

Electronic protection is suitable for DC 24 V circuits in automation and process control (PLCs, sensors, bus modules, actuators etc.) or for communication systems (minus DC 48 V).

Actuation of circuit breakers for equipment protection (to EN 60934)
R-Type: manual reset only
M–type: manual release and occasional manual disconnection (for service purposes)
S-type: manual reset and manual OFF (ON/OFF switch)
J-type: automatic disconnection and autoreset

Snap-action mechanism
The snap-action mechanism featured in many E-T-A products ensures that the contact closing speed is independent of the speed of operation of the actuator (push button rocker, toggle etc.). The moving contact is retained until the actuator causes a defined force to act in the closing direction of the contacts. Once this force is exceeded, the mechanical retention is overcome allowing the contacts to snap closed (tease-free mechanism). The closing speed is a function of this force alone. Snap action mechanisms eliminate contact welding upon switching on to sustained short circuits and minimise the risk of contact wear over the life of a circuit breaker.

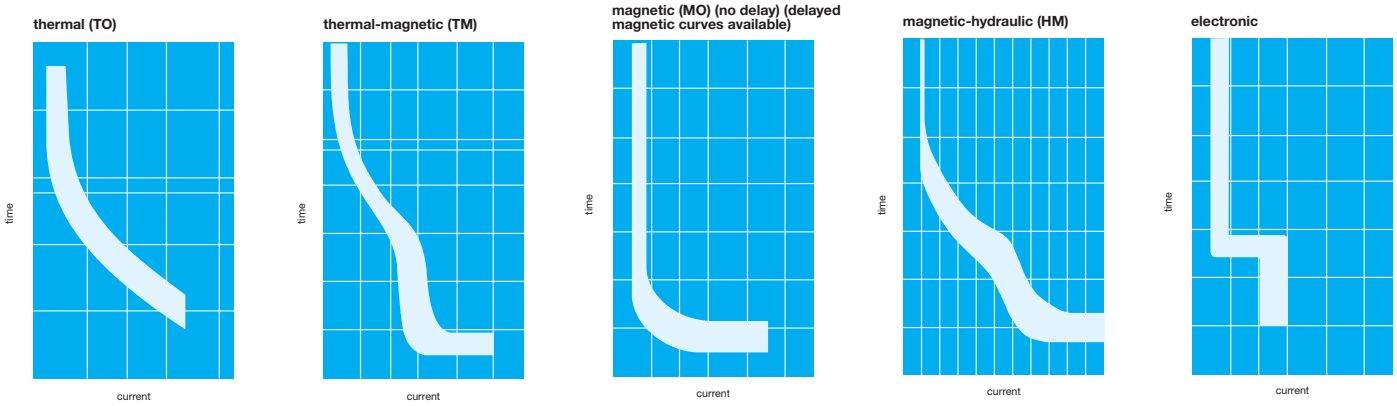
Trip-free mechanism
E-T-A circuit breakers cannot be held closed against an overload. This is achieved through the use of positively trip-free designs in accordance with IEC/EN60934.

Auxiliary contacts
A part of our circuit breaker range is fitted with auxiliary contacts. These electrically separate low current contacts can be included for use with alarm and control switching circuits.

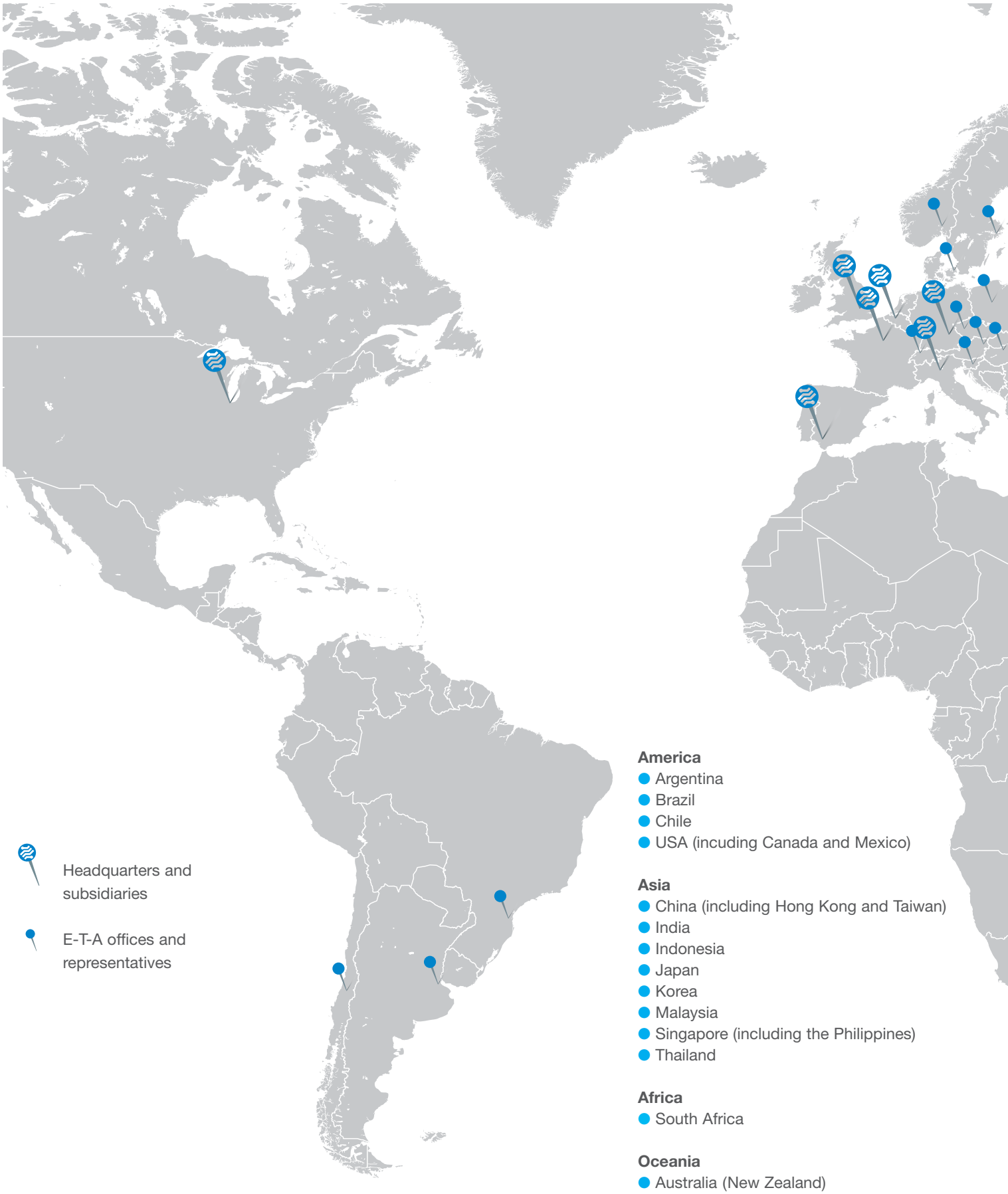
Typical internal resistance values
The internal resistance values shown are typical values for new devices. They may change through storage, life-span or overcurrent. Deviating internal resistance values do not affect the protective function of the circuit breaker.

Accessories for circuit breakers, circuit protectors and system solutions
E-T-A offers a comprehensive range of accessories completing our product portfolio. It includes add-on modules for zero-voltage release or auxiliary contact function as well water splash covers, terminal blocks, sockets, busbars, retaining clips, jumpers and many more. For detailed information please see the individual technical data sheets of our products (www.e-t-a.de), section “Accessories”. For further details on our products please visit www.e-t-a.de

Typical time/current characteristic curves



E-T-A – a globe-spanning network



Headquarters and subsidiaries

E-T-A offices and representatives

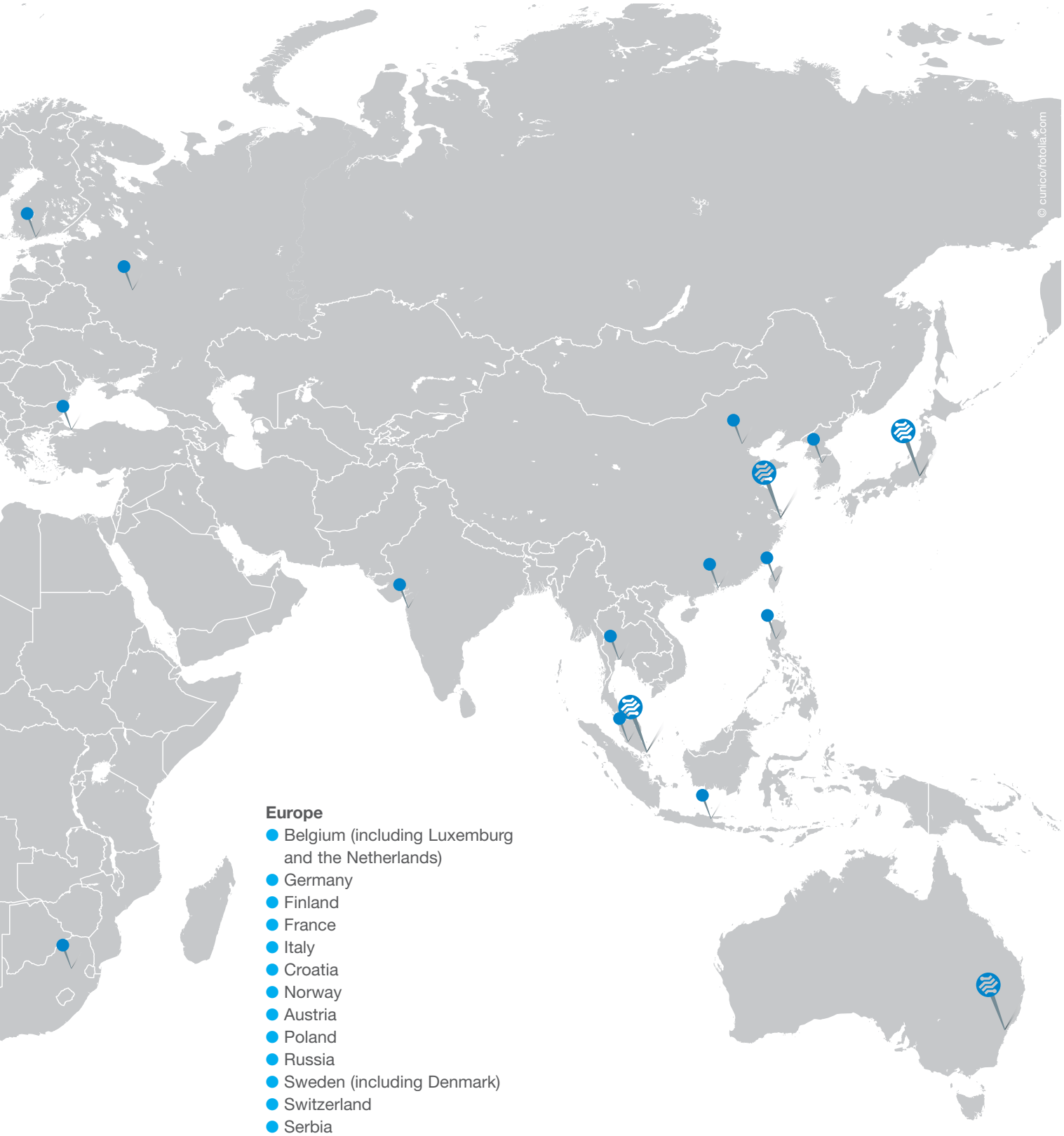
America
- Argentina
- Brazil
- Chile
- USA (incuding Canada and Mexico)

Asia
- China (including Hong Kong and Taiwan)
- India
- Indonesia
- Japan
- Korea
- Malaysia
- Singapore (including the Philippines)
- Thailand

Africa
- South Africa

Oceania
- Australia (New Zealand)

For information on our global network please visit: www.e-t-a.de/contact



Europe

- Belgium (including Luxemburg and the Netherlands)
- Germany
- Finland
- France
- Italy
- Croatia
- Norway
- Austria
- Poland
- Russia
- Sweden (including Denmark)
- Switzerland
- Serbia
- Slovenia (including Bulgaria)
- Spain (including Portugal)
- Czech Republic (including Slovakia)
- Turkey (including Middle East)
- Hungary
- United Kingdom (and Ireland)

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