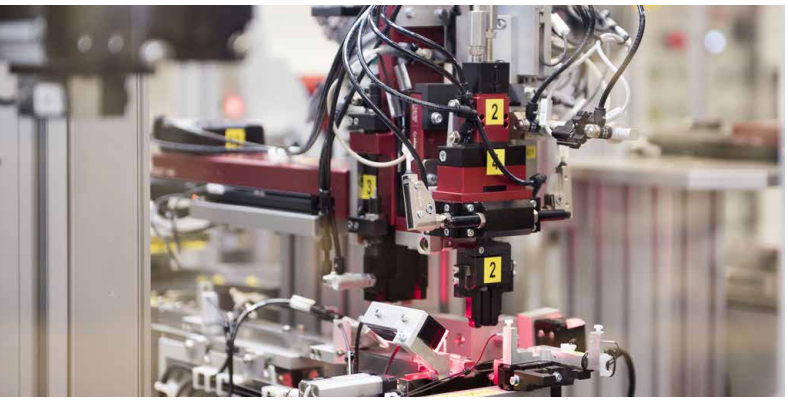
E-T-A®
ENGINEERING TECHNOLOGY

# Circuit Protection and Power Distribution
## Product overview 2020/21



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Protecting – Switching – Monitoring
**Product Overview 2020/21**


WirtschaftsWoche
WELT MARKT FÜHRER
Champion
2020
E-T-A Elektrotechnische Apparate GmbH
Geräteschutzschalter und Sicherungsautomaten
Universität St.Gallen
E-T-A

# A company with a vision

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. Our products are sold by a world-wide network of E-T-A subsidiaries, representatives.and sales partners.

E-T-A products provide protection. In everything we do, with each and every unit we produce 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.

**At the same time we always strive to protect life and limb.** This is also a matter of value protection. We ensure that the equipment and systems where our devices are installed do not get damaged. We ensure that they function and work constantly and that they are paid off in the end.

We make sure that all things equipped with our products are more reliable, more capable and above all safer. This is true for all kinds of equipment, be it a production line, a garden shredder, a truck or an aircraft.

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.

*Dr. Clifford Sell and Dr. Jennifer Sell*
*Directors of E-T-A Elektrotechnische Apparate GmbH*

# Technical Information

**The right E-T-A product for every application**
The enormous choice of different products we offer matches the number of markets and applications where our protection and control products are used. Unlike devices for the undifferentiated mass market, E-T-A solutions are tailor-made for the intended purposes for applications in protection, switching and power management.

The E-T-A focus on industries ensures that the individual sectors are serviced by experienced sales persons with a technical expertise. These experts know their customers' requirements and specialties of the corresponding industries. Together with their customers they develop ground-breaking and sustainable solutions. These are our focus industries:

| | |
|---|---|
| Automation: | Overcurrent protection and power distribution for machine and panel builders |
| Equipment: | Medical equipment, professional tools, equipment control |
| Transportation: | Aerospace, vehicles, railway and marine |

**Automation**
Automation technology is traditionally one of E-T-A's major markets for circuit breakers for equipment protection. The very slim design of E-T-A products provides solutions for applications such as control cabinets where space is at a premium. At the same time they offer unrivalled and cost-effective performance. In automation today, switch mode power supplies, with their particular performance characteristics, are widely used. They require a specific protection design to prevent loads that are subjected to an overload from shutting down complete systems or plants. This a vital aspect when looking at the profitability of plants. E-T-A's electronic circuit protectors provide state-of-the-art selective protection for the outputs of switched mode power supplies.

Efficient, space-saving and cost-effective installation and wiring of the components is realised in the control cabinet together with modular and flexibly designed power distribution systems.

**Equipment**
The field of equipment protection includes a broad range of requirements extending form hand tools, garden and hobby machines, and domestic


appliances to equipment and powered machinery for the healthcare market. Each presents its own engineering demands, and health and safety related considerations.

**Transportation**
E-T-A offers a wealth of specific circuit breakers for automotive applications (passenger cars, buses, trucks etc.) as a replacement of standard blade fuses. The product range also includes battery isolation switches and solid state and power relays. Particularly with regard to shock, vibration and temperature resistance these circuit breakers offer ideal technical properties for special vehicles.

For aerospace applications, E-T-A supplies special high performance circuit breakers meet the requirements of the relevant aircraft standards and carry all necessary approvals required for the installation in all types of aircraft, fixed wing or rotary. Some of these products even meet significantly more severe requirements than mandated for civil aviation.

Railway applications include wall socket protection for laptops as well complete control cabinets for power distribution.

For power distribution in watercraft, E-T-A offers a whole range of circuit breakers. Our rocker-actuated circuit breakers are frequently



used in marine applications. Our portfolio for the marine industry is completed by bus-controlled systems and battery isolation switches which were specifically designed to meet the high requirements of this sector.

**Quality strategy**

E-T-A solutions are safety-critical items expected to perform reliably and predictably – they protect property and people. Safety and reliability have always been prominent within the organisation – in all departments of the company.

Impeccable quality, fast delivery times, first-class service and cost-effective pricing are the differentiators that ensure our competitive edge in the fast-moving global market-place. Responsibility for E-T-A's quality standards is shared by each and every employee. The company will ensure a working environment, and a training and development programme consistent with this objective, such that individuals will be fully competent to take ownership of their quality-related obligations. An essential basis is the documentation of our knowledge. supported by a documented quality system reflecting our wealth of accumulated experience.

Impeccable quality is ensured by robust design, correct parts and optimised processes. Our parts, products and processes are subject to continuous review and improvement. We put emphasis on methodical avoidance of defects over rework and corrective activity.


**A sign of unrivalled reliability.**

**E-T-A's accredited test laboratory**

All low voltage switchgear of E-T-A is subjected to strict quality inspections in our own test laboratory. This is ensured by meeting the requirements of the standard DIN EN ISO/IEC 17025 »General requirements for the competence of testing and calibration laboratories«.

E-T-A's test laboratory was accredited by the DAkkS (German accreditation authority) in 1991 to carry out electrical tests and environmental tests with low voltage switchgear. The E-T-A test laboratory is qualified to test circuit breakers and similar devices – both E-T-A and non-E-T-A product – for compliance with international, European and North American standards. These test results are used for the independent assessment of conformity with EU directives (EU Declaration of Conformity, CE marking).

**Approvals**

Numerous approvals and approval marks provide evidence of the high quality standard of E-T-A solutions. Our products carry internationally renowned approvals including VDE, TÜV (Germany), CSA (Canada), UL (USA), CCC (China) and KC (Korea). For details on individual devices please see the data sheets.

# Technical Information


**At a glance**
This product overview shows the essential technical data for our products. The complete and detailed technical data sheets can be found on our website under www.e-t-a.de/en.

**Side-by-side mounting**
When several devices are mounted together, there may be a mutual thermal influence when they carry rated load. This influence is similar to an increased ambient temperature, depending on the current rating, the number of breakers, the distance between them and the ventilation. When mounted side-by-side, the breakers can only carry up to 80 % of their rated current or a higher rating must be selected.

Please enquire for the max. possible rating in your planned installation.

**Inductive and resistive load**
Every circuit typically has a certain inductance which will intensify arcs. In order to reflect practical experience, the test requirements of IEC/EN 60934 allow testing at inductive or resistive load.

As E-T-A devices are tested accordingly, our technical data show different values (e.g. for typical life) for inductive (cos φ ≈ 0.6, L/R ≈ 2.5 ms) and resistive load (cos φ ≈ 1.0, L/R ≈ 0 ms).

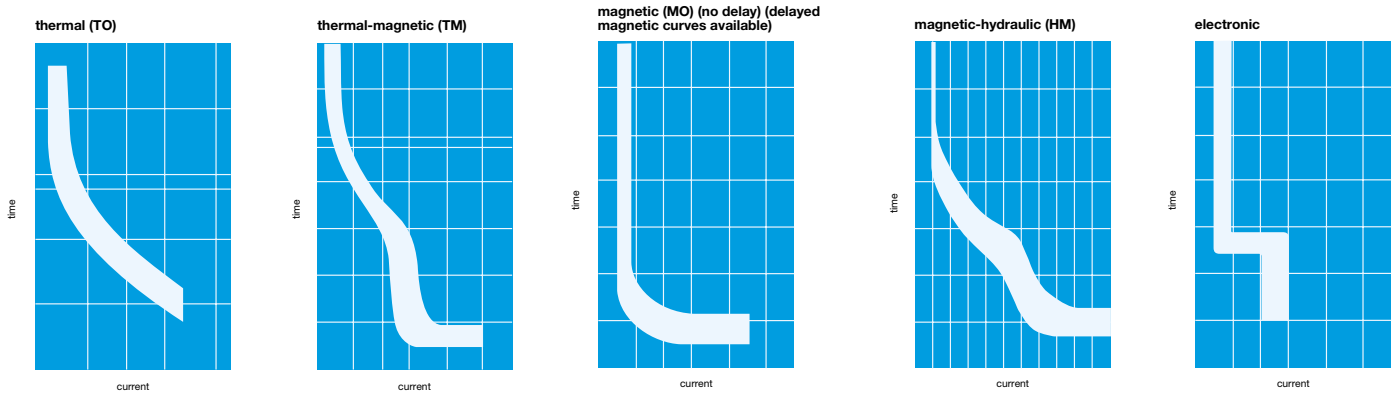
**Temperature behaviour**
The typical time/current characteristics normally relate to an ambient temperature of 23 °C. Thermal and thermal-magnetic circuit breakers are, except for very few models, not temperature compensated and therefore reflect the load to be protected. Their behaviour depends on the ambient temperatures.

Trip times of thermal devices will be faster with higher temperatures and slower with lower temperatures. In order to avoid premature or delayed disconnection with circuit breakers that are constantly used at high or low ambient temperatures, a certain correction factor must applied.

| **ambient temperature [°C]** | | **derating factor (reference values)** |
|---|---|---|
| °C | °F | |
| -20 | -4 | 0.76 |
| -10 | +14 | 0.84 |
| 0 | +32 | 0.92 |
| +23 | +73.4 | 1.00 |
| +40 | +104 | 1.08 |
| +50 | +122 | 1.16 |
| +60 | +140 | 1.24 |

Example: $I_N$ = 10 A at 50 °C means 10 A x 1.16 = 11.6 A. A 12 A circuit breaker rating is recommended.


**Typical time/current characteristic curves**




**Basic Information on Circuit Breaker Types:**

**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 are recommended for all applications where an overload is 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)**

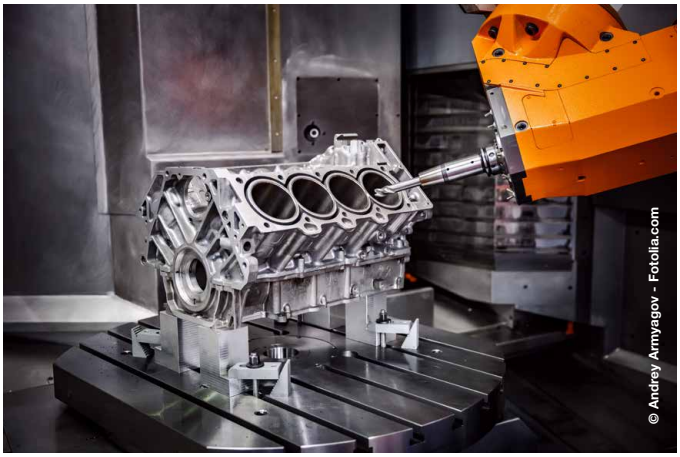
The protective function of thermal-magnetic circuit breakers is achieved by combining temperature and magnetic force. The thermal element of the circuit breakers provides protection in the event of an overload with a delayed trip characteristic. The magnetic part responds without delay to high overload 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.




# Technical Information

**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: with manual release but not intended for frequent use as a switch (for service purposes)
S-type: manual reset and manual OFF (combined switch/CBE function)
J-type: automatic disconnection and autoreset

**Snap-action mechanism**
The snap-action mechanism used 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. The circuit breaker trips reliably in the event of an overcurrent even when the actuator (push button, toggle or rocker) is blocked.


**Auxiliary contacts**
A part of our circuit breaker range offers 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

| Group | Equipment | Transportation | Automation |
|---|---|---|---|
| **Group 1** | | | |
| Thermal circuit breakers (TO) | Medical equipment, domestic appliances, professional tools, apparatus engineering, office equipment | Buses and trucks, passenger cars, construction machinery, agricultural machinery, special vehicles | In individual applications |
| Thermal-magnetic circuit breakers (TM) | In individual applications | In individual applications | Machine building industry, power engineering, plant construction, process control |
| Magnetic and hydraulic-magnetic circuit breakers( MO/MH) | Medical equipment, apparatus engineering | agricultural machinery, construction machinery, special vehicles, | power engineering |
| High performance circuit breakers | – | Aerospace, special vehicles, rail vehicles, construction machinery, agricultural machinery | – |
| **Group 2** | | | |
| Electronic overcurrent protection DC | – | – | Power engineering, machine building industry, factory automation, process control |
| Electronic overcurrent protection AC | – | – | Machine building industry, process control |
| **Group 3** | | | |
| Solid state relays | – | Passenger cars, buses and trucks, construction machinery, agricultural machinery, special vehicles | – |
| SSRPC | – | – | Machine building industry, factory automation, power engineering |
| Power relays | – | Buses and trucks, construction machinery, agricultural machinery, special vehicles | – |
| High voltage contactor | – | Passenger cars, buses and trucks<br>Construction machinery<br>Agricultural machinery<br>Special vehicles | |
| **Groups 4 and 5** | | | |
| Power distribution systems | in applications of all business fields – both as standard systems and as customised solutions (see pages 62 ff.) | | |

# Circuit breakers for equipment protection

## Thermal circuit breakers

**Applications:** Circuit breakers with thermal trip ensure the best possible overload protection for electric motors, transformers, magnetic valves, on-board electrical systems and low voltage lines.

**Engineering:** The trip time of thermal circuit breakers depends on the height and length of the overload current. With higher current ratings, the bimetal or hot wire is heated up until the defined trip time is reached and the device ensures genuine physical isolation of the contacts.

## Magnetic and hydraulic-magnetic circuit breakers

**Applications:** Magnetic and hydraulic-magnetic circuit breakers are ideally suited to the protection of printed circuit boards and semi-conductors against overcurrent and short circuit and to the use in the telecommunications industry.

**Engineering:** Circuit breakers with magnetic or hydraulic-magnetic trip are extremely fast and ensure genuine physical isolation. In the event of short circuit, but also with smaller overloads, the magnetic trip mechanism will disconnect the faulty circuit nearly without any delay. In the overload range, the hydraulic-magnetic trip offers an intended delay.

## Thermal-magnetic circuit breakers

**Applications:** Thermal-magnetic circuit breakers offer the ideal protection against overcurrent and short circuit. They can be particularly recommended for devices and plants in the telecommunications industry, in process control and similar applications requiring precision performance when there is a risk of overload and short circuit

**Engineering:** A combination of bimetal and magnetic coil within the thermal-magnetic circuit breakers ensures reliable protection. These circuit breakers feature genuine physical isolation. The bimetal offers protection in the event of an overload with a time delay. The magnetic coil responds without delay to high overload and short circuit currents and disconnects the faulty circuit within only a few milliseconds.

## High performance circuit breakers

**Applications:** E-T-A high performance circuit breakers are a matter of choice for protection against overcurrent and short circuit in vehicles and aircraft and they are a suitable alternative to MCBs in process measuring and control technology.

**Engineering:** High performance circuit breakers feature thermal or thermal-magnetic trip with a particularly high rupture capacity. Isolation switches and battery master switches are also based on the thermal-magnetic trip principle. The thermal part of the circuit breakers protects loads with a time delay in the event of an overload. The magnetic part responds without delay to high overload and short circuit currents and disconnects the faulty circuit within only a few milliseconds. All our high performance switches of this category offer genuine physical isolation.

# Thermal circuit breakers

## A modern classic for a wealth of applications

The trip time of thermal circuit breakers depends on the height and duration of the overload current. With higher current ratings, the bimetal or hot wire is heated up until the defined trip time is reached.

Circuit breakers with thermal trip characteristics are suitable for protection of loads such as motors, transformers, magnetic valves, low voltage lines and on-board electrical systems.

**Characteristic features**

- A powerful snap action mechanism ensures that closing speed of the contacts is independent from the actuating speed. This increases the endurance of the devices.
- A positively trip-free mechanism ensures reliable trip even if the push button, toggle or rocket actuator is blocked. Operation and protective function are independent of external influences,
- Auxiliary contacts are optional. They offer various signalisation and alerting functions.

**Temperature behaviour**

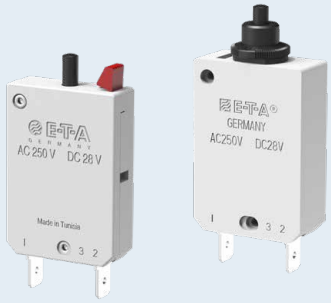
- The time/current characteristics are related to an ambient temperature of +23 °C. In the event of an overload, the trip times become shorter with higher ambient temperatures and longer with lower ones. In order to avoid premature or late disconnection with circuit breakers that are constantly used at high or low ambient temperatures, a certain correction factor has to be applied (see chapter Technical Information).

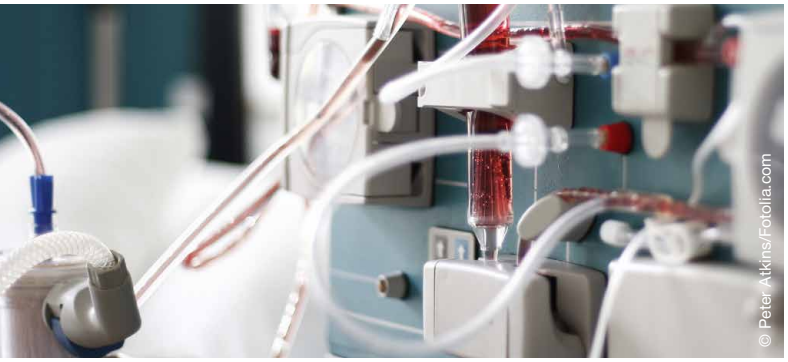
**Approvals**

- 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-spedific standards. For detailed information please see the individual data sheets.

For information on thermal circuit breakers network please visit: **www.e-t-a.de/e001**

| 104-PR.../104/105/106 | Description |
|---|---|
|  | Single pole thermal resettable circuit breakers in miniaturised design, various mounting methods. A positively trip-free snap action mechanism ensures reliable switching behaviour.<br><br>For higher current ratings in a similar design please see type 1140.<br><br>**Typical applications:**<br>● Medical equipment ● Domestic appliances<br>● Professional tools ● Industrial kitchenware<br>● Office equipment ● Apparatus engineering |

| 127/157 | Description |
|---|---|
|  | Single pole thermal resettable circuit breakers, various mounting methods. A positively trip-free snap action mechanism ensures reliable switching behaviour.<br><br>**Typical applications:**<br>● Professional tools<br>● Office equipment<br>● Apparatus engineering and machine construction<br>● Special vehicles |

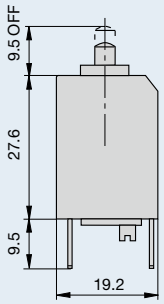





## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 48 V<br>UL/CSA: AC 250 V |
| **Rated current** | 0.05 A ... 10 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 8 A 6 x $I_N$ (AC)<br>0.05 ... 10 A 6 x $I_N$ (DC) |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions

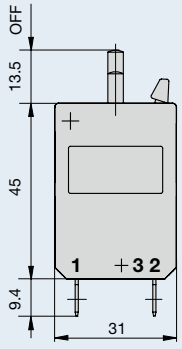



**Example: 104**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V/DC 28 V<br>UL: DC 50 V |
| **Rated current** | 0.05 A ... 25 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 2,5 A 8 x $I_N$<br>3 ... 5 A 20 x $I_N$<br>6 ... 12 A 200 A<br>13 ... 25 A 400 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions




**Example: 127-H**

# Thermal circuit breakers

## 1110/1115

### Description

Single pole thermal circuit breaker/switch combinations also available as reset version. Time-saving snap-in panel mounting, slim vertical design. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**
- Domestic appliances and garden tools
- Industrial kitchenware
- Office equipment
- Apparatus engineering and machine construction

## 1140-E/-F/-G

### Description

Single pole thermal resettable circuit breakers in miniaturised design, various mounting methods. A positively trip-free snap action mechanism ensures reliable switching behaviour.

For smaller current ratings please see series 104/105/106.

**Typical applications:**
- Medical equipment
- Professional tools
- Office equipment
- Lighting engineering
- Household and garden
- Apparatus engineering

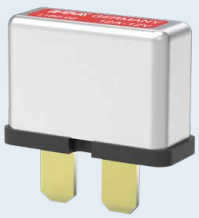
## 1140/2-pole

### Description

Double pole resettable circuit breaker in miniaturised design, one pole thermally protected. Convenient threadneck mounting. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**
- Medical equipment
- Lighting engineering
- Domestic appliances and garden tools
- Professional tools
- Office equipment
- Apparatus engineering and machine construction

## 1160



### Description

Thermal automotive circuit breaker Under overload conditions a contact will open and limit the overcurrent to protect the load. A voltage operated holding coil ensures that the contacts remain open thereby avoiding the hazards of automatic reset operation. The circuit breaker is reset by switching off the supply circuit for a short period. Specially suited to installation in inaccessible locations.

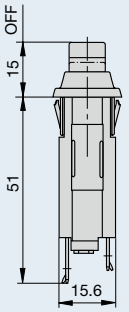
**Typical applications:**
- Passenger cars

For information on thermal circuit breakers please visit: **www.e-t-a.de/e001**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V/DC 50 V<br>UL/CSA: DC 50 V |
| **Rated current** | 0.05 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | AC 250 V: 0.05 ... 10 A: 8 x $I_N$<br>DC 50 V: 0.05 ... 6.5 A: 10 x $I_N$<br>7 ... 16 A: 130 A<br>DC 28 V: 7 ... 10 A: 200 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions

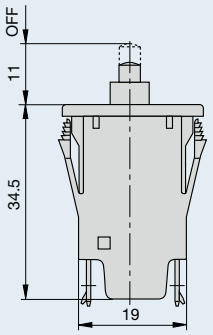



**Example: 1110**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 48 V<br>UL/CSA: AC 250 V<br>UL/CSA: DC 50 V |
| **Rated current** | 3.5 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | 3.5 ... 8 A: 8 x $I_N$<br>9 ... 16 A: 120 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions

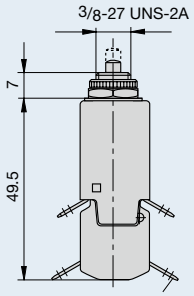



**Example: 1140-F**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 48 V<br>UL/CSA: AC 250 V<br>UL/CSA: DC 50 V |
| **Rated current** | 0.05 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 3 A: 6 x $I_N$<br>3.5 ... 8 A: 8 x $I_N$<br>9 ... 16 A: 120 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e002 |

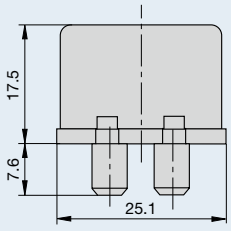
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V |
| **Rated current** | 12 A ... 30 A |
| **Interrupting capacity $I_{cn}$** | 200 A, L/R = 2.5 ms |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e003 |

## Dimensions



# Thermal circuit breakers

## 1170/1176


### Description

Compact single pole thermal circuit breaker with colour coded manual release. A positively trip-free snap action mechanism ensures reliable switching behaviour. Plug-in type for standard automotive fuse blocks. Version 1176 is available especially for the automotive industry, its current ratings correspond to thos of blade fuses. Version 1170 is available with retaining clips for use under harsh environmental conditions.

**Typical applications:**

- Buses and trucks
- Construction machinery
- Special vehicles
- Rail vehicles
- Agricultural machinery

## 1180

### Description

Miniaturised single pole thermal circuit breaker with switching function optional (push-push actuation). A positively trip-free snap action mechanism ensures reliable switching behaviour. Blade terminals fitting into sockets for rail mounting.

**Typical applications:**

- Machine construction
- Process control
- Factory automation
- Power engineering

## 1410-F1

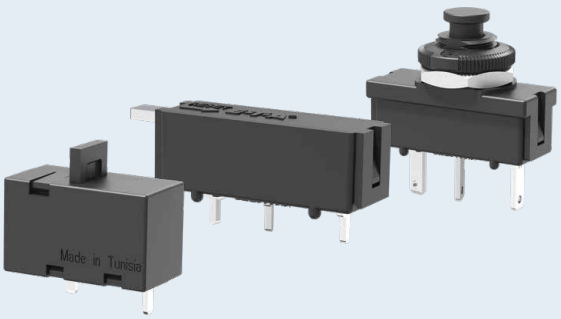

### Description

Single pole thermal circuit breaker/switch combinations Time-saving snap-in mounting. Very fast trip characteristic through specific trip mechanism, low temperature sensitivity. Illumination of the rocker actuator is also available. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**

- Medical equipment
- Lighting engineering
- Domestic appliances and garden tools
- Apparatus engineering and machine construction

## 1410-L1/-L2/-G1




### Description

Single pole thermal resettable circuit breakers in a very compact, miniaturised design, various mounting methods. Very fast trip characteristic through specific trip mechanism, low temperature sensitivity. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**

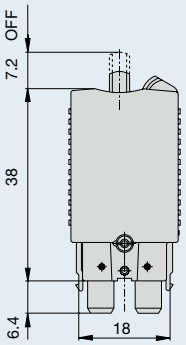
- Medical equipment
- Lighting engineering
- Domestic appliances and garden tools
- Apparatus engineering and machine construction

For information on thermal circuit breakers please visit: **www.e-t-a.de/e001**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V, DC 24 V, DC 48 V |
| **Rated current** | 3 A ... 25 A |
| **Interrupting capacity $I_{cn}$** | 400 A |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e012 |

## Dimensions

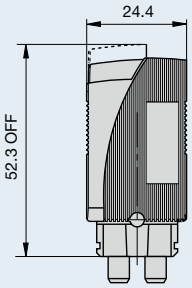



**Example: 1170**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V/DC 65 V<br>UL, UL Canada: DC 72 V |
| **Rated current** | 0.1 A ... 10 A |
| **Interrupting capacity $I_{cn}$** | 0.1…5 A 6 x $I_N$ AC 250 V, DC 65 V<br>6…10 A 8 x $I_N$ AC 250 V, DC 65 V<br>0.1 … 0.7 A 25 x $I_N$ DC 30 V<br>0.8 … 6 A 10 x $I_N$ DC 30 V<br>7 … 10 A 20 x $I_N$ DC 30 V |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e004 |

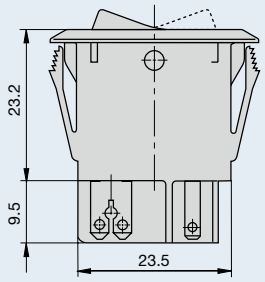
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 28 V<br>UL/CSA: AC 250 V/DC 50 V<br>UL: DC 60 V |
| **Rated current** | 0.63 A ... 10 A |
| **Interrupting capacity $I_{cn}$** | 0.63 ... 2 A: 12 x $I_N$<br>2.5 ... 8 A: 8 x $I_N$ AC, max. 50 A<br>10 A: 6 x $I_N$ AC<br>3.15 ... 10 A: 10 x $I_N$ DC |
| **Ambient temperature** | -20 … +70 °C |
| **For more information please visit** | www.e-t-a.de/e005 |

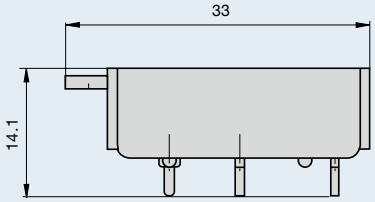
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 28 V<br>(DC 50 V upon request)<br>UL/CSA: AC 250 V/DC 50 V |
| **Rated current** | 0.63 A ... 10 A |
| **Interrupting capacity $I_{cn}$ (o-o-o)** | 0.63 ... 2 A: 12 x $I_N$<br>2.5 ... 8 A: 8 x $I_N$ AC, max. 50 A<br>10 A: 6 x $I_N$ AC<br>3.15 ... 10 A: 10 x $I_N$ DC |
| **Ambient temperature** | -20 … +70 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

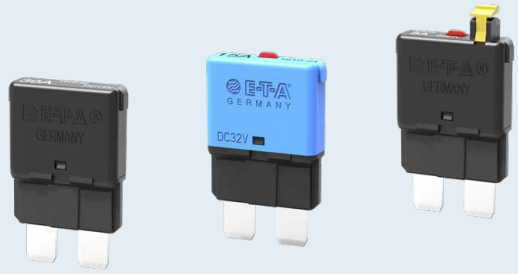
## Dimensions




**Example: 1410-L2**

# Thermal circuit breakers

## 1610/1616



SAE type 1 SAE type 3 SAE type 3

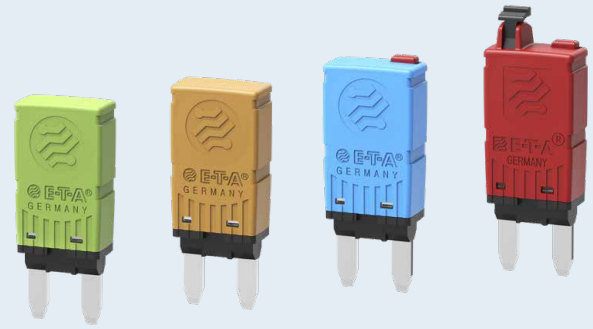
### Description

Single pole thermal automotive circuit breaker in miniaturised design, colour coded housing caps or manual release buttons are optionally available. Blade terminals fit into standard automotive fuse blocks to ISO 8820 part 3, type C. Version 1616 is available especially for the automotive industry (current ratings correspond to those of blade fuses). Meets the requirements of SAE J553 and ISO 10924

**Typical applications:**

- Buses and trucks
- Passenger cars
- Special vehicles
- Construction machinery
- Agricultural machinery

## 1620/1626



SAE type 1 SAE type 2 SAE type 3 SAE type 3

### Description

Single pole, thermal miniaturised circuit breaker for automotive applications. Fits into fuse blocks designed to ISO 8820-3, type F. Automatic reset (for DC 12 V only) and open circuit (modified reset to SAE) version optional. Open circuit version ensures contacts staying open as long as power is on. The circuit breaker will reset after the load is removed. Current ratings of the 1616 version correspond to those of blade fuses. Meets the requirements of SAE J553 and ISO 10924

**Typical applications:**

- Buses and trucks
- Passenger cars
- Special vehicles
- Construction machinery
- Agricultural machinery

## 1658

### Description

Single pole thermal resettable circuit breakers, cost-optimised version. Various mounting methods. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**

- Medical equipment
- Domestic appliances and garden tools
- Professional tools
- Apparatus engineering

## 3120

### Description

Single pole to three pole thermal circuit breaker/switch combinations. Time-saving snap-in mounting. Rocker or push button actuation. Illumination or water splash protection optional; various add-on modules available such zero voltage release module. Reliable switching behaviour through trip-free mechanism. Thermal-magnetic version please see 3120-M.

**Typical applications:**

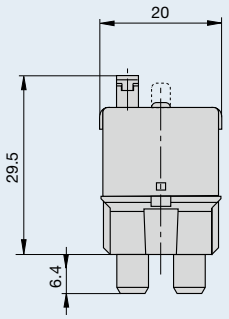
- Medical equipment
- Household and garden
- Professional tools
- Office equipment
- Industrial kitchenware
- Apparatus and machine construction

For information on thermal circuit breakers please visit: **www.e-t-a.de/e001**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V (1610/1616-92)<br>DC 24 V (1610/1616-21/-H2) |
| **Rated current** | 5 A ... 40 A |
| **Interrupting capacity $I_{cn}$** | > = 3 break operations at 150 A or<br>> = 1 break operation at 2 000 A |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions

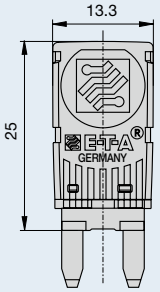



**Example: 1610-H2**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V (1620/1626-1/-2)<br>DC 24 V (1620/1626-3/-3H) |
| **Rated current** | 5 A ... 30 A DC 12 V<br>5 A ... 25 A DC 24 V |
| **Interrupting capacity $I_{cn}$** | ≥ 3 break operations at 150 A or<br>≥ 1 break operation at 2 000 A |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions

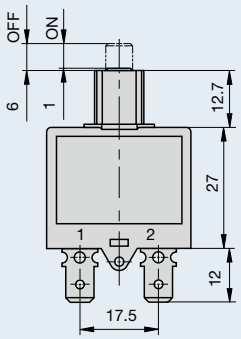



**Example: 1620**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V<br>DC 28 V |
| **Rated current** | 5 A ... 30 A |
| **Interrupting capacity $I_{cn}$** | 5 ... 7 A: 180 A<br>8 ... 30 A: 200 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e006 |

## Dimensions

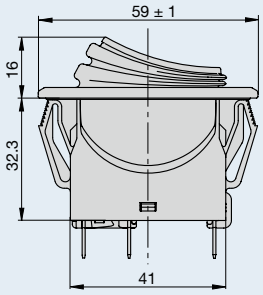



**Example: 1658**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V (AC 415 V on request)/<br>DC 50 V<br>UL/CSA: AC 250 V |
| **Rated current** | 0.1 A ... 20 A<br>(up to 30A upon request for single pole units) |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 2 A: 10 times rated current<br>2.5 ... 20 A: 200 A 1-pole<br>2.5 ... 20 A: 300 A 2-pole |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e016 |

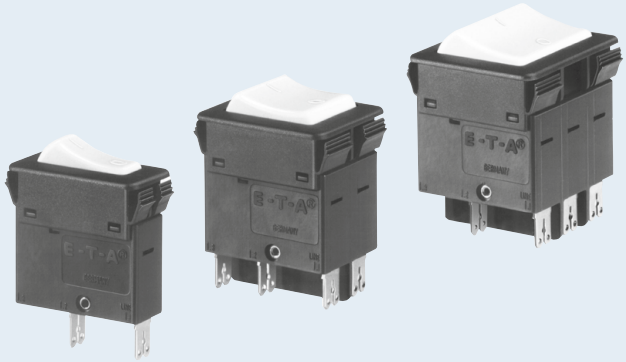
## Dimensions




**Example: 3120-N3.4-G7...**

# Thermal circuit breakers

## 3130



### Description

Single pole to three pole thermal circuit breaker/switch combinations. Time-saving snap-in mounting. Rocker or push button actuation. Illumination or water splash protection optional; various add-on modules available such zero voltage release module. Reliable switching behaviour through trip-free mechanism.

**Typical applications:**

- Medical equipment
- Household and garden
- Professional tools
- Office equipment
- Industrial kitchenware
- Apparatus and machine construction

## 3131

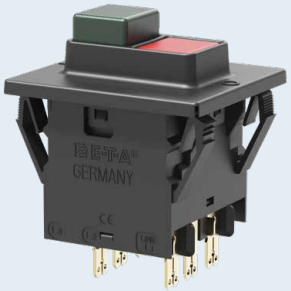
### Description

Single pole thermal circuit breaker/switch combinations Convenient snap-in mounting, high degree of protection (IP66). Illumination optional. Wide range of rocker legends. Also available as a three-position switch. Reliable switching behaviour through trip-free mechanism.

**Typical applications:**

- Apparatus engineering and machine construction
- Special vehicles
- Leisure boats
- Work boats
- Recreational vehicles

## 3140



### Description

Three-pole thermal circuit breaker/switch combination with push button actuation. Convenient snap-in mounting, high degree of protection (IP66). Add-on modules optionally available, e.g. undervoltage release module. Reliable switching behaviour through trip-free mechanism.

**Typical applications:**

- Domestic appliances and garden tools
- Professional tools

## 4130

### Description

Single pole thermal resettable circuit breaker with high current ratings. Convenient threadneck mounting. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**

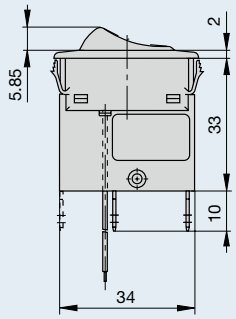
- Professional tools
- Apparatus engineering and machine construction
- Construction machinery
- Agricultural machinery
- Special vehicles

For information on thermal circuit breakers please visit: **www.e-t-a.de/e001**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V (AC 415 V on request)/<br>DC 50 V<br>UL/CSA: AC 250 V |
| **Rated current** | 0.1 A ... 20 A<br>(up to 30A upon request for single pole units) |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 2 A: 10 times rated current<br>2.5 ... 20 A: 200 A 1-pole<br>2.5 ... 20 A: 300 A 2-pole |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

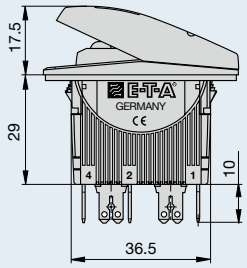
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 28 V |
| **Rated current** | 0.1 A ... 20 A |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 2 A: 10 x $I_N$<br>2.5 ... 20 A, 150 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

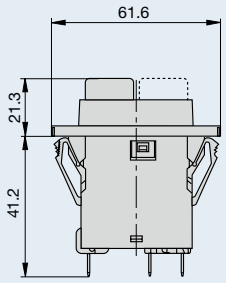
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 415 V |
| **Rated current** | 0.1 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 2 A: 10 x $I_N$<br>2.5 ... 16 A: 150 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e007 |

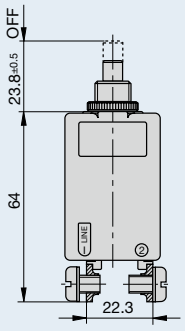
## Dimensions




## Technical data

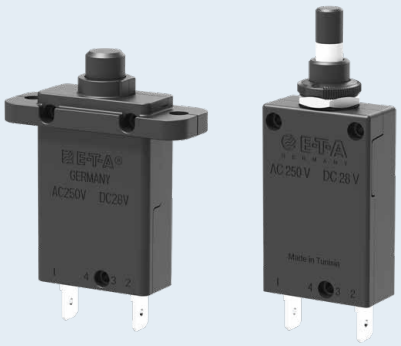
| | |
|---|---|
| **Voltage ratings** | AC 240 V/DC 50 V |
| **Rated current** | 20 A ... 70 A |
| **Interrupting capacity $I_{cn}$** | 800 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e008 |

## Dimensions



# Thermal circuit breakers

## 2-5000/2-5700




## Description

Single pole thermal resettable circuit breakers, various mounting methods. Upon request, type 2-5700 is also available as a push-push version, i.e. with manual switch-off option. A positively trip-free snap action mechanism ensures reliable switching behaviour. Other versions such as 2-5200 and 2-6400 available.

**Typical applications:**

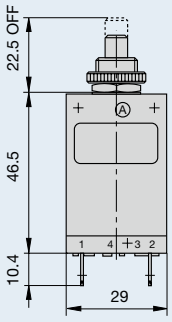
- Domestic appliances and garden tools
- Apparatus engineering and machine construction
- Construction machinery
- Agricultural machinery
- Special vehicles

For information on thermal circuit breakers please visit: **www.e-t-a.de/e001**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V/DC 28 V<br>UL/CSA: DC 50 V |
| **Rated current** | 0.05 A ... 25 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 2.5 A: 8 times rated current<br>3 ... 5 A: 20 times rated current<br>6 ... 12 A: 200 A, higher rupture capacity upon request<br>13 ... 25 A: 400 A |
| **Ambient temperature** | -20 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e001 |

## Dimensions




**Example: 2-5700**

# Thermal-magnetic circuit breakers

## 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 late disconnection with circuit breakers that are constantly used at high or low ambient temperatures, a certain correction factor has to be applied (see chapter Technical Information).

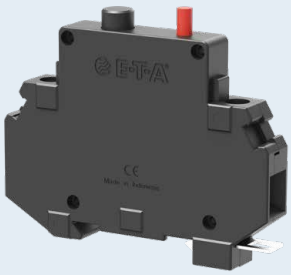
**Time/current characteristics**

- 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.

For information on thermal-magnetic circuit breakers please visit: **www.e-t-a.de/e050**

| 201 | Description |
|---|---|
|  | Single pole, track-mountable thermal-magnetic circuit breaker with manual release button. A positively trip-free snap action mechanism ensures reliable switching behaviour.<br><br>**Typical applications:**<br>● Machine construction<br>● Factory automation |

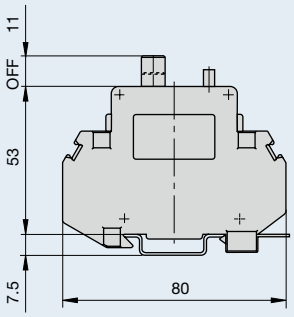
| 2210-S | Description |
|---|---|
|  | Single or multipole thermal-magnetic circuit breaker with toggle actuation, designed for panel mounting or plug-in mounting, trip-free mechanism and various trip curves. Internal linking of multipole devices ensures that all poles trip. Auxiliary contacts and intermediate position optional. Also suitable for power distribution systems.<br><br>**Typical applications:**<br>● Machine construction<br>● Factory automation<br>● Process control<br>● Power Engineering |




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V (50/60 Hz)/DC 65 V<br>UL/CSA: AC 250 V<br>UL/CSA: DC 80 V |
| **Rated current** | 0.05 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 0.8 A: self-limiting 1 ... 2 A:<br>200 A/2.5 ... 16 A: 400 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e051 |

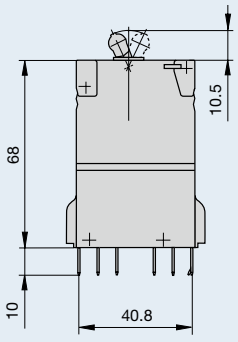
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 433 V (50/60 Hz)<br>AC 250 V/DC 65 V<br>(higher ratings upon request)<br>UL: AC 277/480 V |
| **Rated current** | 0.1 A ... 25 A |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 5 A: 400 A/6 ... 25 A: 800 A<br>0.1 ... 16 A: 2,500 A (at DC 32 V) |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e052 |

## Dimensions



# Thermal-magnetic circuit breakers

## 2210-T2


## Description

Single or multipole thermal-magnetic circuit breaker with toggle actuation, designed for rail mounting, trip-free mechanism, various trip curves. Internal linking of multipole devices ensures that all poles trip. Auxiliary contacts optional.

**Typical applications:**
- Machine construction
- Factory automation
- Process control
- Power Engineering
- Rail technology

## 2215


## Description

Single pole thermal-magnetic circuit breaker with toggle actuation, designed for pcb mounting, trip-free mechanism, various trip curves and optional auxiliary contacts. Also suitable for power distribution systems.

**Typical applications:**
- Factory automation
- Process control

## 2216-S

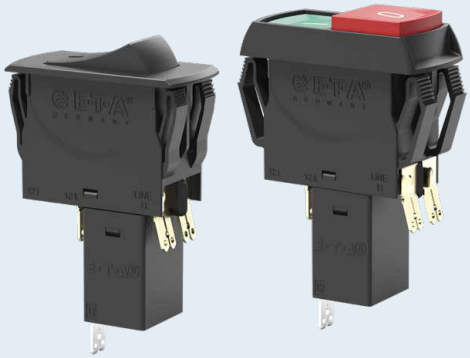

**2216-S with socket 80plus**

## Description

Single or double pole thermal-magnetic circuit breaker with slide actuation in a compact design, trip-free mechanism, various trip curves and optional auxiliary contacts.

**Typical applications:**
- Machine construction
- Factory automation
- Process control
- Power engineering
- Rail technology
- Apparatus engineering and machine construction

## 3120-M1 Description



## Technical data

Combination of circuit breaker and ON/OFF swtich with rocker or push button actuation, double pole (pole 1 thermal-magnetically protected, pole 2 thermally protected or unprotected), front panel mounting. The rocker or button can optionally be supplied with illumination and in a range of colours. Reliable switching behaviour through trip-free mechanism.

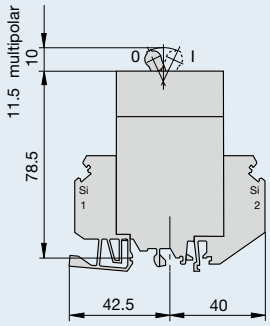
**Typical applications:**
- Machine construction

For information on thermal-magnetic circuit breakers please visit: **www.e-t-a.de/e050**

## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 433 V (50/60 Hz)<br>AC 250 V/DC 65 V (higher ratings upon request)<br>UL/CSA: AC 277/480 V |
| **Rated current** | 0.1 A ... 32 A |
| **Interrupting capacity $I_{cn}$** | 0.1 ... 5 A: 400 A/6 ... 32 A: 800 A<br>0.1 ... 16 A: 2,500 A (at DC 32 V) |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e053 |

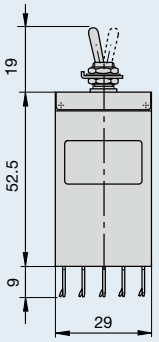
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V (50/60 Hz)<br>DC 50 V (higher DC ratings upon request)<br>UL: DC 75 V |
| **Rated current** | 0.05 A ... 10 A |
| **Interrupting capacity $I_{cn}$** | 300 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e054 |

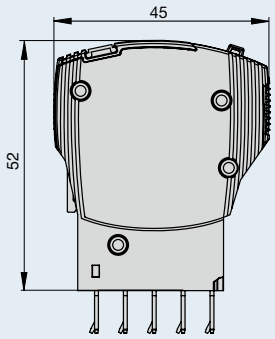
## Dimensions




## Technical data

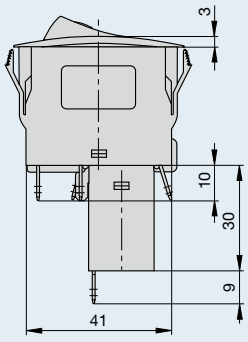
| | |
|---|---|
| **Voltage ratings** | AC 240 V (50/60 Hz)/DC 50 V (1-pole)/DC 80 V (2-pole) |
| **Rated current** | 0.5 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | Single pole: AC 240 V, 300 A/ DC 32 V, 1 500 A/DC 50 V, 600 A<br>Double pole: AC 240 V, 400 A/ DC 32 V, 1 500 A/DC 80 V, 600 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e055 |

## Dimensions




## Dimensions

| | |
|---|---|
| **Voltage ratings** | AC 240 V (50/60 Hz) / DC 50 V |
| **Rated current** | 0.1 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | AC 240 V 0.1 ... 2 A: 100 x $I_N$<br>AC 240 V 2.5 ... 16 A: 250 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e050 |



# Thermal-magnetic circuit breakers

## 3300/3400/3600/3900

3300

3600

## Description

Single pole, thermal-magnetic circuit breakers, options include manual release button, auxiliary contacts or intermediate position A positively trip-free snap action mechanism ensures reliable switching behaviour. Various mounting methods including plug-in type with blade terminals (type 3600), threadneck mounting (types 3300/3400) or flange mounting (type 3500). Its low internal resistance makes type 3900 particularly suitable for low voltage applications.

**Typical applications:**

- Factory automation
- Process control
- Power Engineering

## 4230-T

## Description

Single pole and multipole thermal-magnetic miniature circuit breakers (MCBs) in accordance with EN 60947-2, UL 1077 and UL 489 for DIN rail mounting, with toggle actuation, visual status indication and high rupture capacity. A positively trip-free snap action mechanism ensures reliable switching behaviour. A range of trip characteristics and add-on modules allow a great variety of applications.

**Typical applications:**

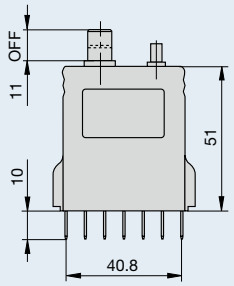
- Factory automation
- Machine construction
- Power engineering
- Process control

For information on thermal-magnetic circuit breakers please visit: **www.e-t-a.de/e050**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V (50/60 Hz)<br>DC 65 V |
| **Rated current** | 0.05 A ... 16 A |
| **Interrupting capacity $I_{cn}$** | 0.05 ... 0.8 A: self-limiting 1 ... 2 A: 200 A<br>2.5 ... 16 A: 400 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e050 |

## Dimensions

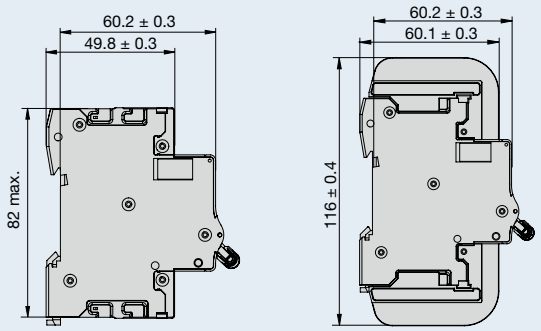



**Example: 3600**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 480/277V; UL DC 60V;<br>IEC DC 80V |
| **Rated current** | from 1 A ... 63 A |
| **Interrupting capacity $I_{cn}$** | to IEC/EN 60947-2<br>($I_{cs}$) DC 10,000 A<br>to IEC/EN 60947-2<br>($I_{cu}$) AC/DC 10,000 A<br>to UL 489 AC/DC 10,000 A |
| **Ambient temperature** | -35 … +70 °C |
| **For more information please visit** | www.e-t-a.de/e057 |

## Dimensions



# Magnetic and hydraulic-magnetic circuit breakers

## Fast protection – permanent safety

E-T-A's magnetic or hydraulic-magnetic circuit breakers are fast acting. In the event of a short circuit, but already with small overloads they disconnect the faulty circuit without any delay worth mentioning with magnetic trip or with an intended and defined delay with hydraulic-magnetic trip. The individual data sheets provide all necessary details.

Circuit breakers with magnetic or hydraulic-magnetic trip characteristics are the ideal choice if pcb boards or semi-conductors are subjected to short circuit hazard.

**Characteristic features**

- The trip element is the magnetic or hydraulic-magnetic system of the breaker. Depending on this system, the limit of the trip current may range to higher or lower currents.
- Current peaks, e.g. caused by inrush currents, may cause nuisance tripping. Insensitivity against current peaks can be achieved by selecting a model with a higher current rating. We shall be pleased to support you with the selection.

**Temperature behaviour**

- The temperature behaviour at rated load is independent of the ambient temperature.

**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.

**Options include**

- Auxiliary contacts: They offer various signalisation and alerting functions.
- Remote trip This feature offers the possibility to physically disconnect the circuit via an impulse.
- Remote ON/OFF actuation: The circuit can be physically disconnected via an impulse and can then be reconnected.

Information on magnetic and hydraulic-magnetic circuit breakers: **www.e-t-a.de/e100**

| 808 | Description |
|---|---|
|  | Single pole polarised circuit breaker with high-speed magnetic operating mechanism. An artless switching system ensures reliable disconnection even with the smallest overcurrents. Also suitable for impulse operation. Compact design suitable for printed circuit board mounting. Low temperature sensitivity.<br><br>**Typical applications:**<br>● Power Engineering<br>● Medical equipment<br>● Equipment Control |

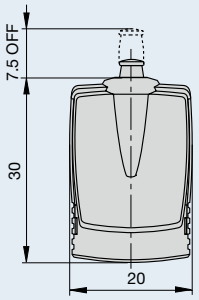
| 8340-G2 | Description |
|---|---|
|  | Single and multipole circuit breaker with magnetic or hydraulic-magnetic trip curve. Convenient threadneck panel or plug-in mounting, a range of trip characteristics and optional auxiliary contacts. Push/pull on/off manual actuation. The precision switching mechanism is positively trip-free and ensures reliable disconnection even with the smallest overcurrents. Low temperature sensitivity at rated load.<br><br>**Typical applications:**<br>● Rail vehicles<br>● Constructional vehicles<br>● Agricultural machinery<br>● Special vehicles |




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V (other ratings upon request)<br>UL/CSA: AC 120 V<br>UL/CSA: DC 60 V |
| **Rated current** | 0.01 A ... 5 A |
| **Interrupting capacity $I_{cn}$** | 100 A (o-o-o) |
| **Ambient temperature** | -30 … +70 °C |
| **For more information please visit** | www.e-t-a.de/e101 |

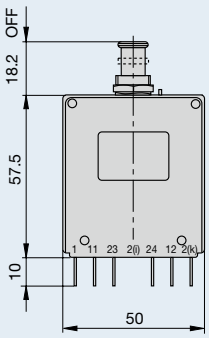
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 415 V<br>AC 240 V (50/60 Hz)<br>DC 80 V<br>UL/CSA: AC 250 V |
| **Rated current** | 0.02 A ... 50 A 1-pole<br>(40 and 50 A only DC)<br>0.02 A ... 30 A multipole |
| **Interrupting capacity $I_{cn}$** | 6 x $I_N$ at AC/4 x $I_N$ at DC |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e102 |

## Dimensions



# Magnetic and hydraulic-magnetic circuit breakers

## 8340-F


### Description

Single and multipole circuit breaker with magnetic or hydraulic-magnetic trip curve. Toggle actuation, front panel mounting, various trip characteristics and optional auxiliary contacts. The precision switching mechanism is positively trip-free and ensures reliable disconnection even with the smallest overcurrents. Low temperature sensitivity at rated load.

**Typical applications:**

- Telecommunications
- Datacom

## 8340-T


### Description

Single and multipole circuit breaker with magnetic or hydraulic-magnetic trip curve. Toggle actuation, rail mounting, various trip characteristics and optional auxiliary contacts. The precision switching mechanism is positively trip-free and ensures reliable disconnection even with the smallest overcurrents. Low temperature sensitivity at rated load.

**Typical applications:**

- Rail vehicles
- Special vehicles

## 8345

### Description

Single and multipole circuit breaker with magnetic or hydraulic-magnetic trip curve. Toggle actuation, front panel mounting, various trip characteristics and optional auxiliary contacts. The precision switching mechanism is positively trip-free and ensures reliable disconnection even with the smallest overcurrents. Low temperature sensitivity at rated load. Add-on modules for auxiliary contacts, remote trip and remote control are optionally available.

**Typical applications:**

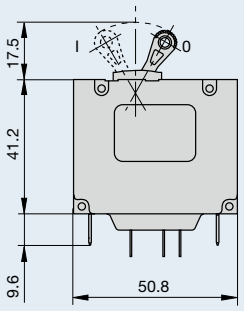
- Telecommunications
- Datacom
- Rail vehicles
- Special vehicles

Information on magnetic and hydraulic-magnetic circuit breakers: **www.e-t-a.de/e100**

## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 415 V/AC 240 V (50/60 Hz)<br>DC 80 V (higher DC ratings upon request)<br>UL/CSA: 3 AC 250 V/AC 250 V |
| **Rated current** | 0.02 A ... 50 A 1-pole<br>(40 and 50 A only DC)<br>0.02 A ... 30 A multipole |
| **Interrupting capacity $I_{cn}$** | 6 x $I_N$ at AC/4 x $I_N$ at DC |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e103 |

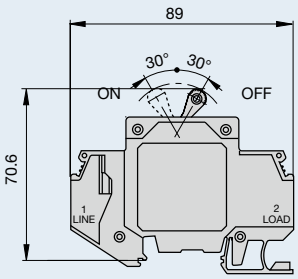
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 415 V/AC 240 V (50/60 Hz)<br>DC 80 V (higher DC ratings upon request)<br>UL/CSA: 3 AC 250 V/AC 250 V |
| **Rated current** | 0.02 A ... 50 A 1-pole<br>(40 and 50 A only DC)<br>0.02 A ... 30 A multipole |
| **Interrupting capacity $I_{cn}$** | 6 x $I_N$ at AC/4 x $I_N$ at DC |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e104 |

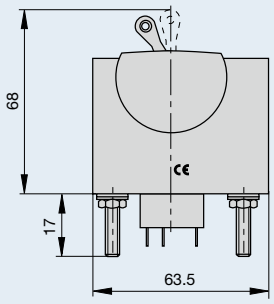
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | 3 AC 415 V<br>AC 277/480 V<br>AC 120/240 V<br>AC 240 V/DC 80 V |
| **Rated current** | 0.05 A ... 125 A<br>150 A ... 180 A, one pole protected |
| **Interrupting capacity $I_{cn}$** | 10,000 A at DC/5000 A at AC |
| **Ambient temperature** | -40 … +85 °C |
| **For more information please visit** | www.e-t-a.de/e105 |

## Dimensions



# High performance circuit breakers

## Professional protection – unrivalled performance

E-T-A high performance circuit breakers feature thermal or thermal-magnetic trip characteristics and an extremely high rupture capacity.

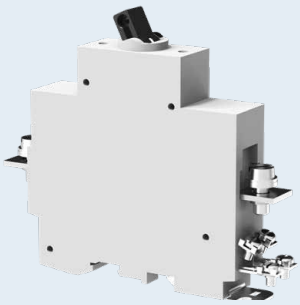
The thermal element of the circuit breakers provides protection in the event of an overload with a delayed trip characteristic. The magnetic element responds without time delay to high overload and short circuit currents. It disconnects the faulty circuit within a few milliseconds.

**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.
- The devices have a positively trip-free mechanism. Protective function is independent of external influences even if the push button or operating toggle is blocked.
- All types offer high creepage resistance and are flame retardant.
- Some models are available with auxiliary contacts as an option. They offer various signalisation and alerting functions.

High performance circuit breakers are the ideal alternative to MCBs in measuring and control equipment, in vehicles (rail, road, water) and in aerospace technology (on the ground and air-borne).

Information on high performance circuit breakers: **www.e-t-a.de/e150**

| 410/520/530 | Description |
|---|---|
|  | Single pole (type 410), double pole (type 520) or three-pole (type 530) thermal-magnetic high performance circuit breakers to EN 60947 for various mounting methods, with toggle actuation and high rupture capacity. A positively trip-free snap action mechanism ensures reliable switching behaviour. A range of trip characteristics, auxiliary contacts and remote control options allow a great variety of applications.<br><br>**Typical applications:**<br>● Rail vehicles<br>● Agricultural machinery<br>● Constructional vehicles<br>● Special vehicles |

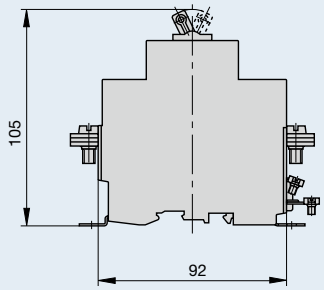
| 412/413 | Description |
|---|---|
|  | Single pole thermal circuit breaker with threadneck mounting, push-pull operation and high rupture capacity. A positively trip-free snap action mechanism ensures reliable switching behaviour.<br><br>**Typical applications:**<br>● Rail vehicles<br>● Construction machinery<br>● Agricultural machinery<br>● Special vehicles<br>● Aerospace |




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 240 V/3 AC 415 V<br>DC 110 V |
| **Rated current** | 10 A ... 125 A (EN 60947)<br>7 A ... 100 A (EN 60898) |
| **Interrupting capacity $I_{cn}$** | AC 240 V: 6,000 A<br>DC 110 V: 5,000 A |
| **Ambient temperature** | -40 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e150 |

## Dimensions

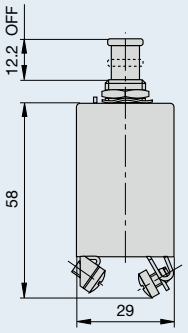



**Example: 410**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 28 V<br>AC 115 V (400 Hz) upon request |
| **Rated current** | 6 A ... 25 A (-FN)<br>7.5 A ... 35 A (-LN/-N)<br>Smaller ratings upon request. |
| **Interrupting capacity $I_{cn}$** | DC 28 V: 6,000 A |
| **Ambient temperature** | -55 … +75 °C |
| **For more information please visit** | www.e-t-a.de/e150 |

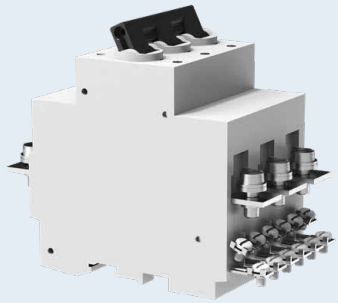
## Dimensions




**Example: 412**

# High performance circuit breakers

## 437



### Description

Single pole, thermal-magnetic circuit breaker with toggle actuation and high rupture capacity. A positively trip-free snap action mechanism ensures reliable switching behaviour. Various housing versions, trip characteristics, auxiliary contacts and remote control option allow a wealth of applications.

**Typical applications:**
- Rail vehicles
- Special vehicles

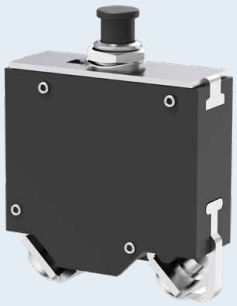
## 446/447/449


### Description

Single pole, thermal-magnetic high performance circuit breakers with socket mounting, manual release button, high rupture capacity and optional auxiliary contacts and/or remote trip. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**
- Construction machinery
- Agricultural machinery
- Special vehicles

## 452



### Description

Single pole, thermal-magnetic circuit breaker with threadneck mounting, push-pull operation, high rupture capacity and optional auxiliary contacts. A positively trip-free snap action mechanism ensures reliable switching behaviour.

**Typical applications:**
- Construction machinery
- Agricultural machinery
- Special vehicles
- Aerospace

## 482


### Description

Single pole, thermal circuit breaker with threadneck mounting, push-pull operation, high rupture capacity and optional auxiliary contacts. A positively trip-free snap action mechanism ensures reliable switching behaviour.

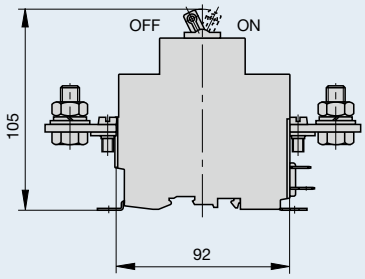
**Typical applications:**
- Construction machinery
- Agricultural machinery
- Special vehicles
- Aerospace

Information on high performance circuit breakers: **www.e-t-a.de/e150**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 144 V<br>higher ratings upon request |
| **Rated current** | 40 A ... 240 A<br>higher ratings upon request |
| **Interrupting capacity $I_{cn}$** | DC 180 V: 2,000 A, L/R = 0 ms<br>DC 28 V: 10,000 A, L/R = 0 ms<br>DC 28 V: 7,500 A, L/R = 13 ms |
| **Ambient temperature** | -40 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e151 |

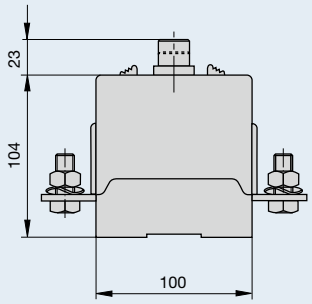
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 28 V |
| **Rated current** | 30 A ... 400 A type 446<br>100 A ... 400 A type 447<br>125 A ... 500 A type 449 |
| **Interrupting capacity $I_{cn}$** | 10,000 A |
| **Ambient temperature** | -55 … +75 °C |
| **For more information please visit** | www.e-t-a.de/e150 |

## Dimensions

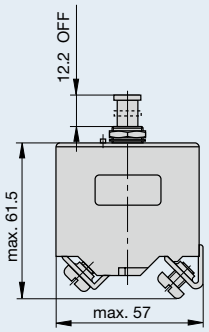



**Example: 446**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 28 V (UL: DC 72 V) |
| **Rated current** | 50 A ... 100 A |
| **Interrupting capacity $I_{cn}$** | 6,000 A |
| **Ambient temperature** | -55 … +75 °C |
| **For more information please visit** | www.e-t-a.de/e152 |

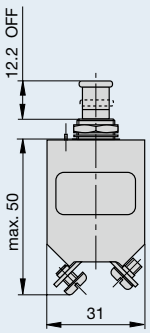
## Dimensions




## Technical data

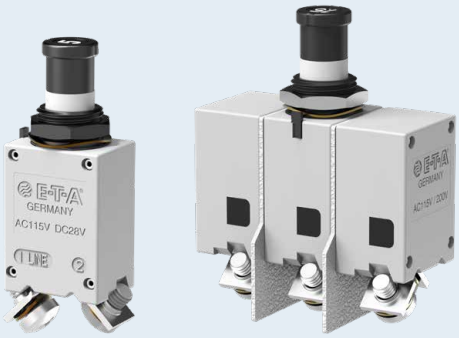
| | |
|---|---|
| **Voltage ratings** | AC 115 V (400 Hz)<br>DC 28 V<br>AC 230 V (50/60 Hz) upon request |
| **Rated current** | 0.1 A ... 50 A |
| **Interrupting capacity $I_{cn}$** | 0,1 ... 2.5 A 15 x $I_N$<br>3 ... 3.5 A 250 A DC/150 A AC<br>4 ... 7 A 500 A<br>7.5 ... 50 A 6,000 A DC/1,000 A AC |
| **Ambient temperature** | -55 … +75 °C |
| **For more information please visit** | www.e-t-a.de/e153 |

## Dimensions



# High performance circuit breakers

## 483/583




### Description

Single pole or three-pole thermal circuit breaker with threadneck mounting, push-pull operation, temperature compensation, high rupture capacity and optional auxiliary contacts. A positively trip-free snap action mechanism ensures reliable switching behaviour.

The special design ensures suitability for the most demanding applications.

**Typical applications:**
- Aerospace

## 4120

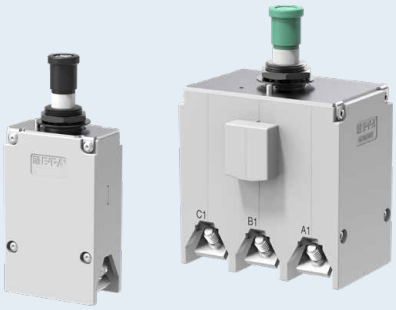

### Description

Single pole, thermal circuit breaker with threadneck mounting, push-pull operation, temperature compensation, high rupture capacity and optional auxiliary contacts. Reliable switching behaviour through trip-free mechanism.

The special design ensures suitability for the most demanding applications.

**Typical applications:**
- Aerospace

## 4140/5140




### Description

Single pole or three-pole thermal circuit breaker with threadneck mounting, push-pull operation, temperature compensation, high rupture capacity and optional auxiliary contacts. Reliable switching behaviour through trip-free mechanism.

The special design ensures suitability for the most demanding applications.

**Typical applications:**
- Aerospace

## 9510

### Description

Single pole aircraft simulator switch with threadneck mounting or flange mounting, push-pull operation and extremely low trip current. Push button marking either with marking insert (exchangeable) or with adhesive labels. Blade terminals, screw terminals or wrap terminals, auxiliary contacts optional.

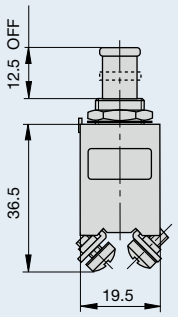
**Typical applications:**
- Aerospace (simulators)

Information on high performance circuit breakers: **www.e-t-a.de/e150**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 115 V (400 Hz) (483)<br>3 AC 200 V (400 Hz)/DC 28 V(<br>583) |
| **Rated current** | 1 A ... 35 A (483)<br>1 A ... 30 A (583) |
| **Interrupting capacity $I_{cn}$** | AC 115 V (400 Hz) <= 4 A:<br>1,000 A/5 A: 2,000 A/7.5 ... 35 A<br>2,500 A/DC 28 V: 1 ... 25 A<br>6,000 A/30 + 35 A: 4,000 A |
| **Ambient temperature** | -55 … +125 °C |
| **For more information please visit** | www.e-t-a.de/e154 |

## Dimensions

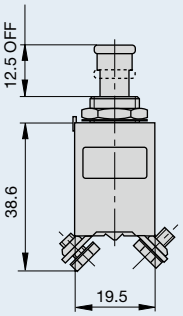



**Example: 483**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 115 V (400 Hz)<br>DC 28 V |
| **Rated current** | 1 A ... 25 A |
| **Interrupting capacity $I_{cn}$** | AC 115 V (400 Hz) 1 ... 4 A<br>1,000 A/5 ... 25 A 2,000 A<br>DC 28 V: 1 ... 25 A: 6,000 A |
| **Ambient temperature** | -55 … +125 °C |
| **For more information please visit** | www.e-t-a.de/e155 |

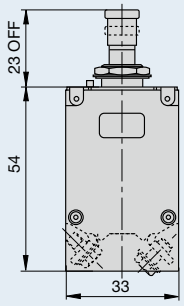
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 115 V (400 Hz)<br>DC 28 V |
| **Rated current** | 20 A ... 50 A |
| **Interrupting capacity $I_{cn}$** | AC 115 V (400 Hz) 1,500 A (4140)<br>DC 28 V: 4,000 A (4140)<br>AC 200 V (400 Hz): 2,000 A<br>(5140) |
| **Ambient temperature** | -55 … +125 °C |
| **For more information please visit** | www.e-t-a.de/e150 |

## Dimensions

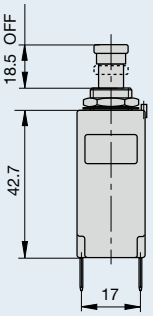



**Example: 4140**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V<br>DC 28 V |
| **Markings** | 0.5 ... 150 A |
| **Ambient temperature** | -30 … +60 °C |
| **For more information please visit** | www.e-t-a.de/e158 |

## Dimensions




**Example: 9510 without aux. contacts**

# Electronic overcurrent protection DC and AC

## Electronic circuit protectors and electronic circuit breakers

Electronic circuit protectors are purely electronic overcurrent protection devices. Electronic circuit breakers, however, offer mechanical disconnection in addition to the electronic trip, i.e. genuine physical isolation (bimetal).

## Electronic overcurrent protection DC

**Applications**

Electronic overcurrent protection by means of electronic circuit protectors and circuit breakers is ideally suitable for the selective protection of system components in industrial plants and their supply lines, which are powered by DC switch mode power supplies.

**Engineering**

Electronic overcurrent protection prevents a voltage dip of the DC24V output voltage of switch mode power supplies both at a short circuit and at overload. At the same time these products ensure selective protection or disconnection. They also allow to easily switch on loads with high input capacities and to signal any failures or errors in the system. Failure indication is by means of LEDs and auxiliary contacts. This enables targeted trouble-shooting and increases machine uptime.

## Electronic overcurrent protection AC

**Applications**

Electronic overcurrent protection by means of electronic AC circuit breakers is ideally suited to the selective protection of uninterruptible power supplies (UPS) in industrial plants. These solutions ensure the power safety through AC UPS systems.

**Engineering**

Electronic overcurrent protection provided by electronic AC circuit breakers prevents disconnection of the entire output voltage of UPS systems in the event of a short circuit as well as in the event of an overload. At the same time these products ensure selective protection or disconnection even under very unfavourable load conditions. This is achieved by the breakers responding faster than the UPS itself to the overload condition. Besides the selective protection these devices offer a very high entire saving potential.

# Electronic overcurrent protection DC

## Keep your automated systems running.

**Major tasks:**
Electronic overcurrent protection provides selective protection of system components in industrial plants powered by DC 24 V power supplies as well as of their supply lines. At the same time it prevents voltage dips of the power supply's output voltage to values below 18 V. This works reliably both in the event of a short circuit and at overload in a load circuit.

E-T-A's electronic overcurrent protection ensures selective protection and disconnection, even under very unfavourable overload conditions. At the same time it allows switching on high input capacities without increasing the selected current rating.

E-T-A's electronic overcurrent protection devices also provide signalling of any failures that occurred in the system. They enhance transparency and minimise downtimes.

**Characteristic features**
All electronic protective elements allow connection of various load types, from resistive and inductive to capacitive loads. Switching of lamp loads and motors can be made available upon request. We offer models with fixed or with adjustable current ratings.

The devices have overload-proof and short circuit proof switching outputs with active short circuit current limitation and a trip characteristic which depends on the overload. It is similar to the thermal-magnetic characteristics, but has a significantly narrower tolerance band.

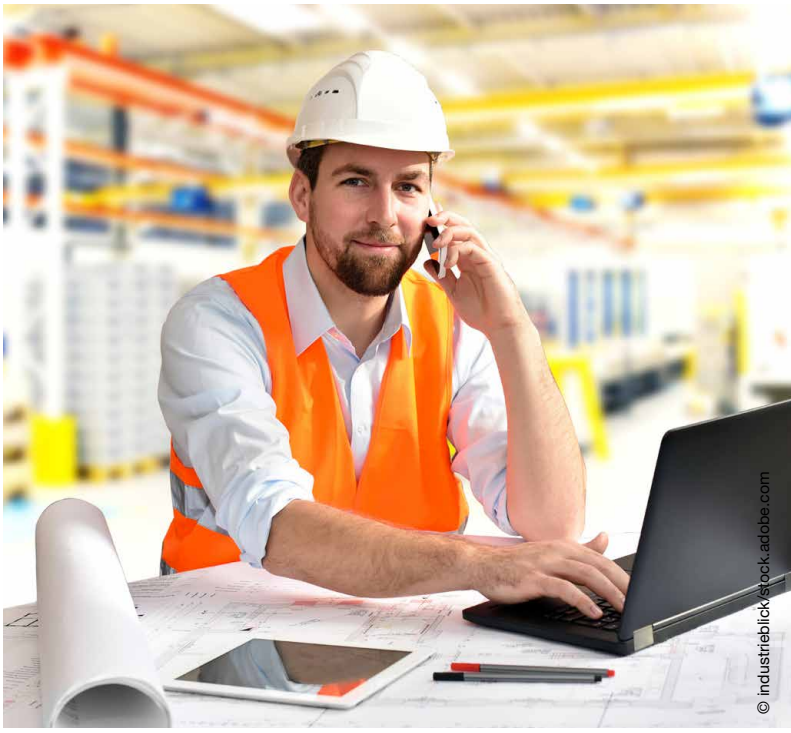
**Your benefits**
- Enhanced system availability through clear failure detection
- Reduced downtimes through quick failure remedy
- Simplified planning through clear sizes and ratings
- Cost and time savings

For information on Electronic overcurrent protection DC breakers please visit: **www.e-t-a.de/e350**

| ESS22-T | Description |
|---|---|
|  | The ESS22-T double pole electronic circuit breaker allows individual integration into a plant concept of ungrounded power supply networks in the DC 24 V range. It features a narrow width of only 22.5 mm and a height and depth of only 90 mm and is therefore the ideal solution for compact control cabinets. The selective load protection of the ESS22-T provides double pole physical isolation of only the faulty path in the event of overload or short circuit.<br><br>**Typical applications:**<br>● Factory automation ● Process control |

| ESS30-S | Description |
|---|---|
|  | The electronic circuit breaker ESS30-S with physical isolation is a »low energy breaker« for DC 24 V applications, available in fixed and adjustable current ratings. It is approved to VDE EN/IEC 60934 and UL1077 as a circuit breaker for equipment protection and supplementary protector and therefore ideally suitable for the use in centralised and decentralised power supply units.<br><br>**Typical applications:**<br>● Factory automation<br>● Process control<br>● Power Engineering |

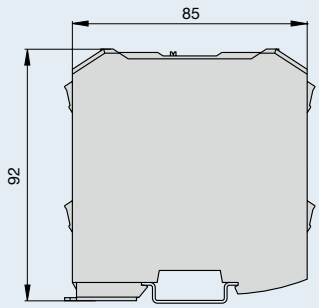





## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 3 A, 4 A, 6 A, 8 A, 10 A |
| **current limitation** | typically 1.4 x $I_N$ |
| **Ambient temperature** | 0 ... +50 °C |
| **For more information please visit** | www.e-t-a.de/e352 |

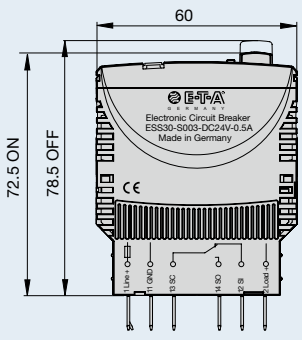
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 1/2 A, 3/6 A, 2 A, 3 A, 3.6 A, 4 A, 6 A, 8 A, 10 A |
| **current limitation** | typically 1.2 x $I_N$ |
| **Ambient temperature** | 0 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e353 |

## Dimensions



# Electronic overcurrent protection DC

## ESS31-T

## Description

The electronic circuit breaker type ESS31-T offers genuine physical isolation. After manual disconnection or trip, the physical isolation will effectively prevent any power feedback to the DC24V control voltage. Type ESS31-T allows disconnection of the overload at 1.2 times rated current within 500 ms, in the event of a short circuit even within 100 ms.

**Typical applications:**

- Machine construction
- Factory automation

## ESX10/ESX10-S

## Description

The ESX10 and the ESX10-S protect each individual load circuit against overload and short circuit and will disconnect the load electronically and selectively in the event of a failure. E-T-A's ESX10 is available in a range of fixed current ratings from 0.5 A to 16 A. The ESX10-S is an adjustable device and available from 1 – 10 A in 1 A increments. Both devices feature a plug-in design and fit into the power distribution modules 17plus and 18plus.

**Typical applications:**

- Machine construction
- Factory automation
- Process control

## ESX10-T

## Description

The ESX10-T model offers track-mountable overcurrent protection. At a width of only 12.5mm it provides selective protection for all DC 12 V and DC 24 V load circuits. This is achieved by a combination of active electronic current limitation in the event of a short circuit and overload disconnection typically from 1.1 times rated current. The ESX10-T protects all kinds of loads with a single trip curve.

**Typical applications:**

- Machine construction
- Factory automation
- Process control

## REF16-S

**REF16-S with socket 81plus**

## Description

The REF16-S selective load protection exclusively disconnects the faulty path in the event of overload or short circuit in the load circuit without any repercussions on the DC 24 V supply. If there is a failure in a single load circuit, a voltage dip will thus be reliably prevented and equally a failure of all loads connected to the switch mode power supply. The REF16-S limits the short circuit current to typically 1.25 times rated current and disconnects the faulty circuit after 800 ms at the latest.

**Typical applications:**

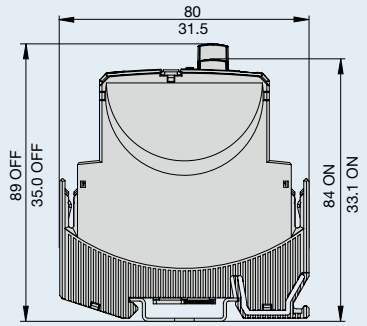
- Machine construction
- Factory automation

For information on Electronic overcurrent protection DC breakers please visit: **www.e-t-a.de/e350**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 3 A, 3.6 A, 4 A, 6 A, 8 A, 10 A, 12 A |
| **Current limitation** | typically 1.2 x $I_N$ |
| **Ambient temperature** | 0 ... +50 °C |
| **For more information please visit** | www.e-t-a.de/e354 |

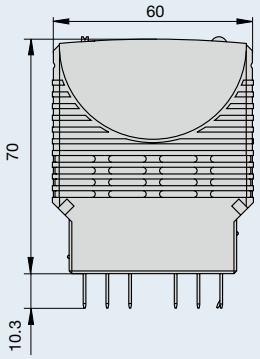
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 3 A, 4 A, 6 A<br>8 A, 10 A, 12 A<br>adjustable current ratings:<br>1-10 A in 1 A steps |
| **Current limitation** | typically 1.8/1.5/1.3 x $I_N$<br>typically. 1.4 x $I_N$ / 2.5 |
| **Ambient temperature** | 0 ... +50 °C |
| **For more information please visit** | ESX10: www.e-t-a.de/e355<br>ESX10-S: www.e-t-a.de/e356 |

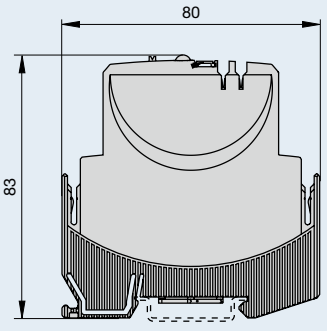
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V, DC 24 V, DC 48 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 3 A, 4 A, 6 A,<br>8 A, 10 A, 12 A, (16 A), 20 A,<br>25 A<br>adjustable 0.5/1/2 A, 2/3/4 A,<br>2/4/6 A, 6/8/10 A |
| **Current limitation** | typically 1.8/1.5/1.3 x $I_N$ |
| **Ambient temperature** | -25 ... +60°C |
| **For more information please visit** | www.e-t-a.de/e357 |

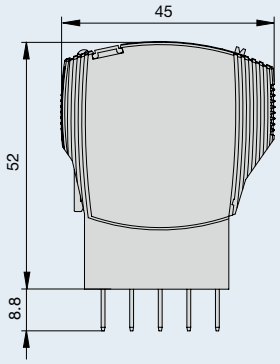
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 3 A, 4 A, 6 A,<br>8 A, 10 A |
| **Current limitation** | typically 1.25 x $I_N$ |
| **Ambient temperature** | -25 ... +50 °C |
| **For more information please visit** | www.e-t-a.de/e358 |

## Dimensions



# Electronic overcurrent protection DC

## EM12-T supply module

## Description

The EM12 supply modules for the power input of the REX system are available in different versions, providing genuine flexibility with regard to costs and functionalities.

**Typical applications:**
- Machine construction

## PM12-T potential module

## Description

The PM12-T power distribution concept of the REX system can very easily be divided into two main groups. In the same system, the user can easily realise not only the + DC 24 V distribution, but also the minus distribution 0 V (GND).

**Typical applications:**
- Machine construction

## REX12-T electronic circuit protector

## Description

The REX12 electronic circuit protector combines flexibility with a compact design, no matter if it has one or two channels. REX12, this means a space-saving and reliable protection, tailor-made for primary pulsed DC 24 V switch mode power supplies.

The single-channelled circuit protector is available in all standard fixed current ratings from 1 A to 10 A. The double-channelled devices are available in the fixed current ratings 1 A, 2 A, 3 A, 4 A and 6 A as well as in adjustable versions from 1 A to 10 A and 1 A to 4 A.

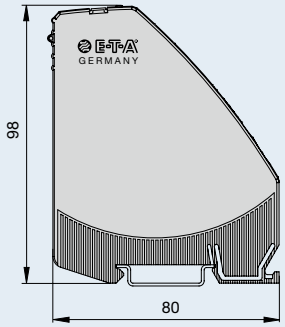
**Typical applications:**
- Machine construction

For information on Electronic overcurrent protection DC breakers please visit: **www.e-t-a.de/e350**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V (18 ... 30 V) |
| **Rated current** | max. 40 A |
| **Ambient temperature** | -25 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e359 |

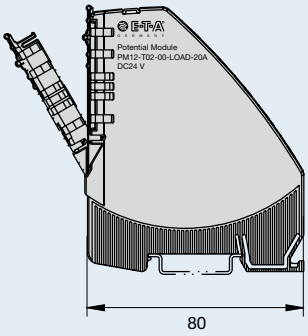
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V (18 ... 30 V) |
| **Rated current** | max. 20 A |
| **Ambient temperature** | -25 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e359 |

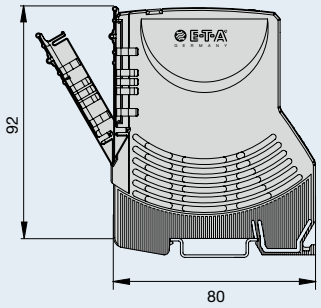
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V (18 ... 30 V) |
| **Rated current** | single channel: 1 A, 2 A, 3 A, 4 A, 6 A, 8 A, 10 A<br>double channel: 1 A/1 A, 2 A/2 A, 3A/3 A, 4 A/4 A, 6 A/6 A<br>double channel: 1 A...4 A, 1 A...10 A |
| **Current limitation** | time-current characteristics (REX12-T) |
| **Ambient temperature** | -25 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e359 |

## Dimensions



# Electronic overcurrent protection AC

## Power safety for UPS operation

The mechatronic circuit breaker type EBU10-T provides selective overcurrent protection in AC 230 V UPS systems. The unit 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 EBU10-T 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. The EBU10-T tolerates switch-on operations and the corresponding high inrush currents.

**Your benefits**

- Enhanced system availability through effective protection
- Reduction of overall costs through a 1/3 more effective rating
- Easy planning with a variable overcurrent protection

For information on Electronic overcurrent protection AC breakers please visit: **www.e-t-a.de/e400**

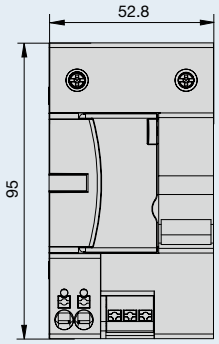
| EBU10-T | Description |
|---|---|
|  | The hybrid EBU10-T circuit breaker (Electronic Breaker Unit) has been especially designed for the protection of AC UPS systems. The unit effectively ensures a stable supply and thus real power safety. The circuit breaker consists of an MCB and an add-on electronic circuitry, which takes over measuring and evaluation tasks. The device can be adjusted to the capabilities of the UPS used. In the event of a failure the circuit breaker will disconnect only the faulty path.<br><br>**Typical applications:**<br>● Factory automation<br>● Process control |




## Technical data

| | |
|---|---|
| **Operating voltage** | AC 230 V, |
| **Rated current** | 4 A, 6 A, 10 A, 16 A |
| **Interrupting capacity $I_{cn}$** | 2 cycles (O-CO); $U_N$ AC); 10,000A; cos phi = 0.5 |
| **Ambient temperature** | -35 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e400 |

## Dimensions



# Relay

## Solid state relays

**Applications**
Solid state relays are suitable for a continuous current up to 50 A. They are used in any application where mechanical relays would quickly come up against their limits. Electronic solid state relays switch more often and faster than mechanical relays and operate silently. They are used in construction machinery, special vehicles, buses, trucks and passenger cars.

**Engineering**
Solid state relays combine high-end power semi-conductors with comprehensive know-how on the score of heat management, EMC-compliant design and overcurrent protection.

## Multifunctional relays

**Applications**
Multifunctional relays with customised software are especially suitable for the use in passenger cars, trucks and buses as well as construction machinery and emergency vehicles. They monitor frequencies and voltages as well as the corresponding switching of loads with a high power input. In addition, these relays can include functions which otherwise would have to be implemented by controlgear.

**Engineering**
E-T-A multifunctional relays combine a well-proven mechanical or fully electronic contact system with a customer-specific software. The software allows many custom designed adjustments so that they can be used as a direct replacement of standard automotive relays.

## Timer relays

**Applications**
Timer relays are especially suitable for the use in passenger cars, trucks, buses as well as in construction machinery and emergency vehicles. They control pumps, valves or motors, which are meant to overtravel or stay open for a defined period of time They equally control the co-ordinated, sequential switch-on of loads to avoid load peaks (e.g. with fans).

**Engineering**
E-T-A timer relays combine a well-proven mechanical or electronic contact system with the flexibility of an electronic counter. When replacing a standard automotive relay, you can add ON or OFF delay or both.

## Power relays

**Applications**
Power relays are reliable problem solvers when it comes to switching high currents. Especially vehicles of the construction machinery and agriculture as well as buses, trucks and floor conveyor vehicles and other special vehicles (e.g. fire brigades) often carry large electrical loads. In these applications, power relays disconnect the entire on-board electrical system from the battery.

**Engineering**
Depending on the application, E-T-A offers purely electro-mechanical relays, solid state relays and also a hybrid design consisting of an electro-mechanical switching system with an intelligent electronic control unit.

## High voltage relay

**Applications**
The HVR10 high voltage relay is the right solution for the electrified power train in buses, trucks, construction machinery and specialty vehicles. The powerful unit is equally suitable for charging stations, energy storage and as main relay in vehicles.

**Engineering**
The HVR10 is a hybrid powerful high voltage relay in a compact design. It combines physical isolation of high voltages via an electro-mechanical contact and state-of-the-art semi-conductor technology.

## Solid state remote power controllers

**Applications**
Solid state remote power controllers are used for reliable protection, switching and monitoring of DC 24 V circuits and loads in the steel industry, automation and chemical industry.

**Engineering**
SSRPCs are suitable for reliable switching, protecting and monitoring of resistive and inductive loads. The devices unite functions such as protection against overload or short circuit and as well as wire break detection. They help to avoid consequential damages and downtimes of systems and plants and therefore help to save costs.

# Solid state relays

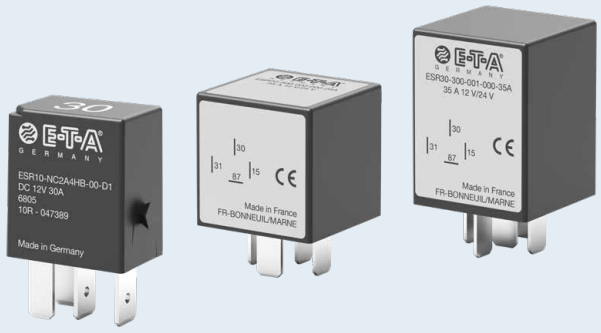
## Durable, robust, silent.

The solid state relay portfolio is used in all applications where mechanical relays reach their limits. They switch more frequently, quieter and faster than mechanical relays and are particularly suitable for applications in buses and trucks, in agricultural vehicles and construction machinery, in specialty vehicles and passenger cars.

**Engineering:**
Solid state relays combine high-end power semi-conductors with comprehensive know-how in the areas of heat management, EMC-compliant design and overcurrent protection. The electronic circuitry ensures wear-free, silent and extremely fast switching operations over the entire life span.

**Your benefits:**
- Full usability over the vehicle's entire life span due to wear-free switching operations
- Flexible use due to an enormous resistance against environmental conditions such as dust, humidity and vibration
- Unrivalled driver convenience for the end customer through noiseless switching operations

For information on solid state relay please visit: **www.e-t-a.de/e450**

| ESR10/ESR20/ESR30 | Description |
|---|---|
|  | The ESR10, ESR20 and ESR30 standard solid state relays can replace standard automotive relays in all applications where loads must be switched, for example the controllers of pumps, valves, lighting or fans. The great variety of product versions covers positive and negative control levels and also high side switch and low side switch.<br><br>**Typical applications:**<br>● Buses and trucks<br>● Construction machinery<br>● Boats<br>● Passenger cars<br>● Specialty vehicles<br>● Agricultural and forestry equipment |

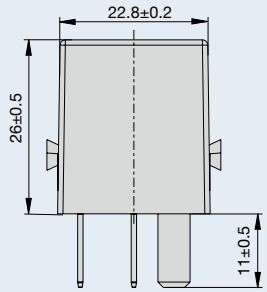
| EXR10 | Description |
|---|---|
|  | The EXR10 solid state relay contains four functions in one unit. Diagnostic function, timer function, relay function and protective function.<br><br>Main functionalities such as overcurrent protection of the EXR10 can be custom designed with a configurator.<br><br>**Typical applications:**<br>● Buses and trucks<br>● Specialty vehicles<br>● Agricultural vehicles and forestry equipment<br>● Construction machinery<br>● Boats |




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/DC 24 V<br>ESR30: DC 24 V |
| **Rated current** | ESR10: 10 A, 17 A, 30 A<br>1,000 V DC<br>ESR20: 4 A, 10 A, 15 A, 25 A, 35 A<br>ESR30: 50 A |
| **Design** | cubic<br>ESR10 22.8 x 15.4 x 26 mm<br>ESR20 30 x 30 x 30 mm<br>ESR30 30 x 30 x 40 mm |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e450 |

## Dimensions

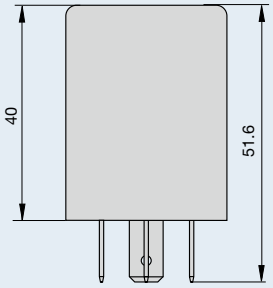



**ESR10**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Rated current** | 1 ... 30 A |
| **Design** | cubic 30 x 30 x 40 mm |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e456 |

## Dimensions



# Multifunctional relays

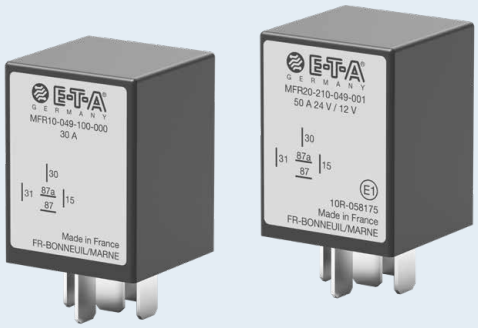
## Custom designed, compatible, durable.

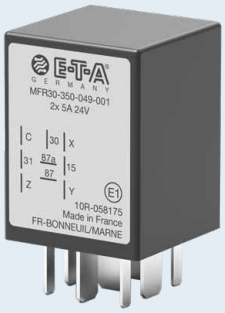
Multifunctional relays with customised software are especially suitable for the use in passenger cars, trucks and buses as well as construction machinery and emergency vehicles. They monitor frequencies and voltages as well as the corresponding switching of loads with a high power input. In addition, these relays can include functions which otherwise would have to be implemented by controlgear.

**Engineering:**
E-T-A multifunctional relays combine a well-proven mechanical or fully electronic contact system with a customer-specific software. The software allows many custom designed adjustments when replacing standard automotive relays which can be required during design, retrofit or adjustment of vehicles.

**Your benefits:**
- Reduction of complexity through customised software, which can individually be adjusted to customers' applications
- Direct replacement of standard relays by intelligent relays with additional functions
- Long life span of the MFR30 due to a fully electronic contact system.

For information on Multifunctional relays state relay please visit: **www.e-t-a.de/e480**

| MFR10/ MFR20 | Description |
|---|---|
|  | The MFR10 and MFR20 multifunctional relays with mechanical contact system can be adjusted to custom designed applications by means of the software. The MFR10 features a versatile terminal-pin-combination. The MFR20 offers high continuous current of 50 A.<br><br>**Typical applications:**<br>● Buses and trucks ● Passenger cars<br>● Construction machinery ● Specialty vehicles<br>● Agricultural vehicles and forestry equipment |

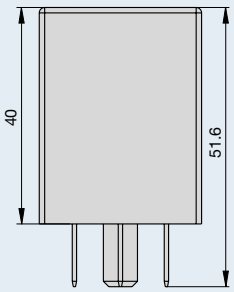
| MFR30 | Description |
|---|---|
|  | The MFR30 multifunctional relay with customer-specific software has a fully electronic contact system. It is therefore particularly suitable for applications which require a high number of operating cycles.<br><br>**Typical applications:**<br>● Passenger cars ● Buses and trucks<br>● Construction machinery ● Specialty vehicles<br>● Agricultural machinery and forestry equipment |




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Rated current** | MFR10 10 A, 30 A<br>MFR20 50 A |
| **Design** | cubic 30 x 30 x 40 mm |
| **Contact system** | mechanical |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | MFR10: www.e-t-a.de/e481<br>MFR20: www.e-t-a.de/e482 |

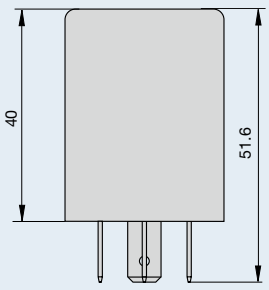
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Rated current** | 4 A |
| **Design** | cubic 30 x 30 x 40 mm |
| **Contact system** | electronic |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e483 |

## Dimensions



# Timer relays

## Flexible, time-saving, cost-saving.

Timer relays are especially suitable for the use in passenger cars, trucks, buses as well as in construction machinery and emergency vehicles. They control pumps, valves or motors, which are meant to overtravel or stay open for a defined period of time. They equally control the co-ordinated, sequential switch-on of loads to avoid load peaks (e.g. with fans).

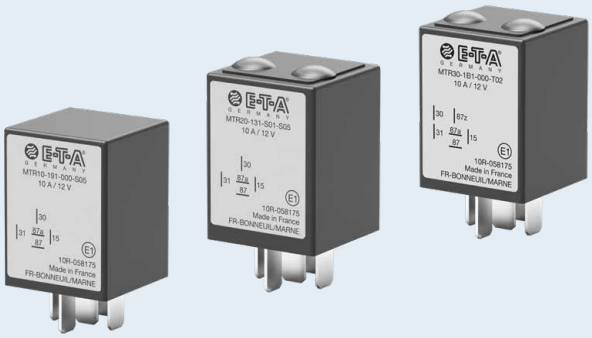
E-T-A timer relays are available for DC 12 V and DC 24 V applications and are suitable for standard automotive relay sockets to ISO 7588.

**Engineering:**
E-T-A timer relays combine a well-proven mechanical or electronic contact system with the flexibility of an electronic counter. When replacing a standard automotive relay, you can add ON or OFF delay or both.

**Your benefits:**
- Reduction of complexity through a customer-specific software that can specially be adjusted to customer applications
- Direct replacement of standard relays by intelligent relays with additional functions
- Long life span of the MTR30 due to a fully electronic contact system.

For information on timer relays please visit: **www.e-t-a.de/e490**

### MTR10/MTR20/MTR30



### Description

MTR timer relays combine a well-proven mechanical contact system with the flexibility of an electronic counter.

- MTR10: fixed time setting
- MTR20: time setting adjustable on site
- MTR30: with position switch and adjustable time adjustment

**Typical applications:**
- Buses and trucks
- Construction machinery
- Specialty vehicles
- Passenger cars
- Agricultural vehicles and forestry equipment

### ETR10


### Description

The ETR10 combines the timer relay function with overcurrent protection in a single component, thus minimising the number of connections in the circuit and reducing the failure risk. In the event that an overload in the load path led to disconnection of the device, the ETR10 can remotely be reset.

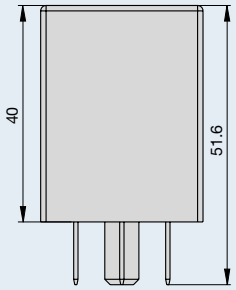
**Typical applications:**
- Buses and trucks
- Construction machinery
- Specialty vehicles
- Passenger cars
- Rail vehicles
- Boats
- Agricultural vehicles and forestry equipment




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/DC 24 V |
| **Rated current** | 10 A/30 A |
| **Design** | cubic<br>30 x 30 x 40 mm |
| **Ambient temperature** | -40 ... +85 °C |
| **Contact system** | mechanical |
| **For more information please visit** | www.e-t-a.de/e490 |

## Dimensions

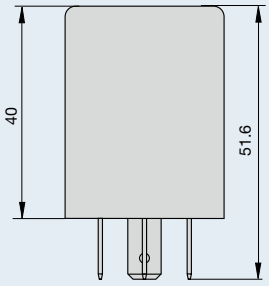



**MTR10**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Rated current** | 10 A/30A |
| **Design** | cubic 30 x 30 x 40 mm |
| **Ambient temperature** | -40 ... +85 °C |
| **Contact system** | electronic |
| **For more information please visit** | www.e-t-a.de/e455 |

## Dimensions



# Power Relays

## No maintenance required – despite high currents

Power relays were designed for switching high current loads and for disconnecting the battery from the on-board electrical system. The single pole power relays MPR10 and HPR10 have an electro-mechanical switching system. Both models are available with various mounting methods. Corresponding to their protection class, the relays are protected against water ingress and dust. Therefore they are an excellent choice for demanding applications in utility vehicles.

The MPR10 power relay is a bistable relay. It only requires a short current pulse for the switching operation. Permanent magnets then keep the contact in the respective position.

The MPR20 is a monostable high current relay. In the event of a power disruption, the relay will at once go into its original state.

HPR10 is hybrid version of the power relay. It includes an electro-mechanical relay and its own electronic control unit. This electronic circuitry can be level- or edge-controlled and manages the intelligent activation of the bistable electro-mechanical switching mechanism, an additional timer control (ON or OFF delay) and other configurable functions.

Both types are available for the usual voltage ratings DC 12 V and DC 24 V.

The EPR10 is a solid state relay for high continuous currents (75 A to 200 A) and is a reliable alternative to a mechanical relay

The EPR10 requires up to 80 % less space than conventional solid state relays because it does not need a heat sink. The low holding current and the low internal resistance reduce power loss and thus thermal losses. The remaining heat is dissipated via the connecting cables. Reduced energy consumption also minimises $CO_2$ emissions.

The relay is practically maintenance-free and has a very long life span compared to conventional mechanical relays. Optionally available functions such as overcurrent protection will additionally reduce system costs.

For information on Power Relays state relay please visit: **www.e-t-a.de/e550**

| MPR10/MPR20/HPR10 | Description |
|---|---|
|  | The single pole power relays MPR10, MPR20 and HPR10 were designed for switching high currents. They are able to switch high current loads and disconnect batteries from the on-board electrical system. The MPR10 bistable power relay and the MPR20 monostable power relay as well as the hybrid version HPR10 consume significantly less energy and help reduce $CO_2$ emissions. They are perfectly suited to switching high electrical loads and can easily be integrated into existing vehicle designs. They can directly be used without any changes on the controlgear.<br><br>**Typical applications:**<br>● Buses and trucks ● Construction machinery<br>● Agricultural vehicles ● Special vehicles |

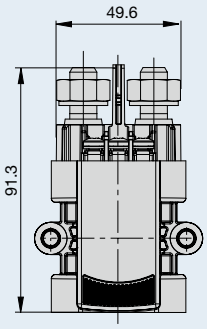
| EPR10 | Description |
|---|---|
|  | The EPR10 electronic power relay is a solid state relay for high continuous currents. It is suitable for use in utility vehicles and special vehicles where reliability and functional safety are at a premium. At DC 24 V, the EPR10 allows a continuous load of up to 200 A. Two versions are available: with (EPR10-P) and without protective function (EPR10-N). Two performance classes are available for EPR10-N (up to 100 A and up to 200 A).<br><br>**Typical applications:**<br>● Construction machinery ● Agricultural machinery<br>● Special vehicles |




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/DC 24 V |
| **Rated current** | 100 A, 200 A, 300 A |
| **Ambient temperature** | -40 ... +85° C |
| **For more information please visit** | MPR10: www.e-t-a.de/e552<br>HPR10: www.e-t-a.de/e553 |

## Dimensions

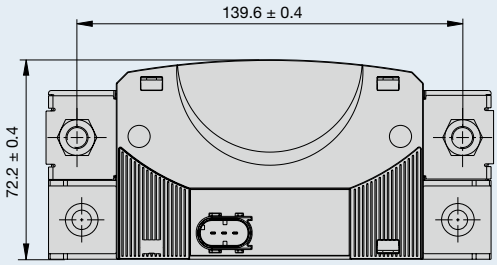



**Example: MPR10**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/DC 24 V |
| **Rated current** | EPR10-P (with protective function) 75 A, 100 A, 125 A, 150 A, 175 A, 200 A |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e551 |

## Dimensions



# High voltage relay

## For the electrified power train

The HVR10 is a hybrid powerful high voltage relay in a compact design. It combines physical isolation of high voltages via an electro-mechanical contact and state-of-the-art semi-conductor technology. The hybrid, arc-free switching system allows repeated and reliable disconnection, even in the event of an overload, of up to 2 megawatts – 2,000 A/1,000 V. The HVR10 withstands high short circuit currents up to 5,000 A until the fast HV-fuse trips. The fist-sized unit can switch and permanently process 300 A up to 100,000 times, arc-free and wear-free. The innovative self-monitoring function immediately signals critical operating conditions to the controlgear.

## Standards

**Meets the requirements of:**

- ISO 16750
- ATF 16949
- ECE R10
- ASIL upon request

**Your benefits**

- Reliable disconnection even in critical conditions up to 2,000 A at 1,000 V
- High protection of the on-board electrical system through integral fault detection and indication
- Long life span due to arc-free switching

| HVR10 | Description |
|---|---|
|  | The HVR10 is based on a hybrid switching concept and unites the advantages of physical isolation with the performance of semi-conductors.<br><br>- arc-free switching<br>- physical isolation<br>- monitoring of mechanical contact bridges<br><br>**Typical applications:**<br>● Buses, trucks, construction machinery and specialty vehicles with electrical power train<br>● Charging stations, power storage and main relays in the vehicle |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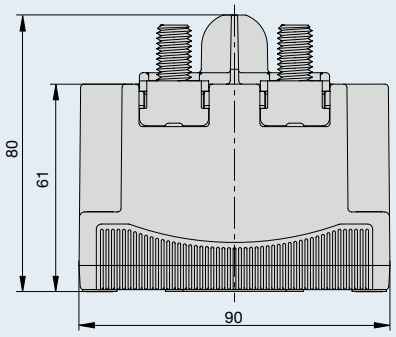
© Getty Images/iStockphoto

## Technical data

| | |
|---|---|
| **Voltage ratings** | 900 V |
| **Max. voltage** | 1000 V |
| **Continuous current** | 300 A |
| **Ambient temperature** | -40 °C … +85 °C |

## Dimensions



# Solid state remote power controllers

## Relay, overcurrent protection and diagnostic functions in a single device

The single pole or double pole solid state remote power controllers combine a relay function with overcurrent protection and diagnostic functions. This means they offer three functions in a single component. The devices were designed for the connection to PLC outputs customary in the industry. They protect connected loads against the consequences of short circuit and overload. Besides the switching function typical of a relay, the SSRPCs are also suitable as a coupling relay for monitoring the circuit with regard to wire break. They feature a compact design and allow control, protection and load circuit diagnosis without time-consuming wiring efforts. This helps to save time and money.

**Features**

Solid state remote power controllers combine three functions in a single component. The offer the best possible load protection and tolerate ambient temperatures up to +60 °C. They can be remotely controlled and are suitable for plug-in and rail mounting.

**Your benefits:**

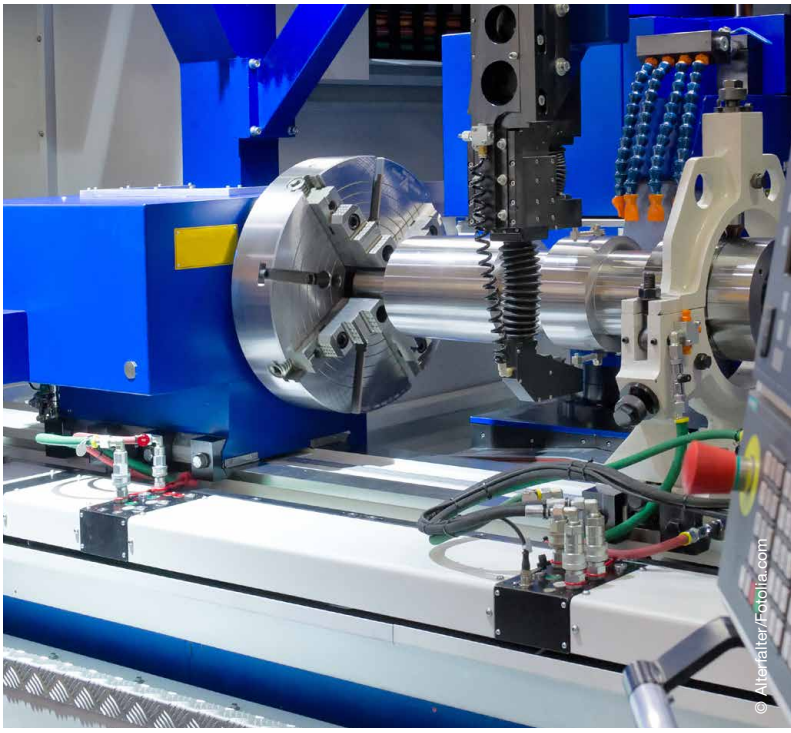
- Increased machine run times through detection of errors and their diagnosis
- Reduced number of components by offering 3 functions in a single unit
- Space savings through a compact design
- Cost reduction through reduction of single components
- Time savings through ease of wiring

For information on solid state remote power controllers please visit: **www.e-t-a.de/e500**

| E-1048-S6 | Description |
|---|---|
|  | The E-T-A solid state remote power controller E-1048-S6xx is a opto-decoupled transistorised switching device providing both protection and signalling. It may be used wherever safe switching and protection of resistive, inductive or lamp loads in DC voltage systems is required.<br><br>**Typical applications:**<br>● Machine construction<br>● Factory automation |

| E-1048-S7 | Description |
|---|---|
|  | The E-T-A solid state remote power controller for PLC outputs E-1084-S7... is a transistor switch with integral protection and signalling functions. It is used in applications where the existing PLC output power is not sufficient. In addition the device provides protection against short circuit and overload as well as a monitoring function with regard to wire break. The solid state remote power controller E-1048-S7.. reduces the number of components such as fuses and relays and avoids the use of expensive powerful output cards.<br><br>**Typical applications:**<br>● Machine construction ● Factory automation |

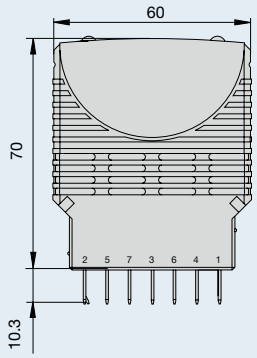





## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 4 A |
| **Current limitation** | 25 A (0.5 A/1 A type)<br>75 A (2 A/4 A type) |
| **Ambient temperature** | 0 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e501 |

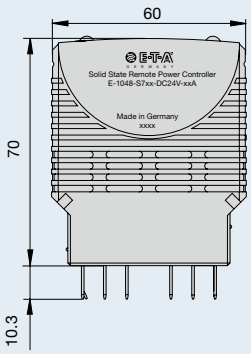
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 0.5 A, 1 A, 2 A, 4 A, 5 A |
| **Current limitation** | 25 A (0.5 A/1 A type)<br>75 A (2 A/4 A/5 A type) |
| **Ambient temperature** | 0 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e502 |

## Dimensions



# Solid state remote power controllers

## E-1072-128

### Description

In accordance with the CE marking of machinery to the EU Machinery Directive, the solid state remote power controller E-1072-128 complies with the requirements of the EN 60204 part 1 in ungrounded DC 24 V supply systems (»IT system«). E-1072-128 is a double pole solid state remote power controller for electromagnetic valves (solenoids), magnetic brakes and clutches with a rated voltage of DC 24 V and a max. current rating of 3 A.

**Typical applications:**

- Factory automation (steel industry)
- Power engineering (power plants)

## E-1048-8I


### Description

The Smart Power Relay E-1048-8I is a remotely controllable electronic relay and holds three functions in a single device:

- Solid state relay
- Electronic overcurrent protection
- Status indication and diagnostic functions

The 7-pole INLINE version fits e.g. into the E-T-A 17-P10-Si socket. The available current rating range is 1 A to 20 A.

**Typical applications:**

- Construction machinery
- Agricultural machinery
- Special vehicles

## E-1072-100

### Description

E-T-A's E-1072-100 solid state remote power controller is a double pole electronic switching amplifier. It is suitable for resistive and inductive loads as well as lamp loads and capacitive loads with a rated voltage of DC 24 V and a max. current rating of 3 A. The double electronic switching output eliminates inadvertent start-up or dangerous machine movements as may arise upon a ground fault in systems with ungrounded power supply (»IT systems«) (see Machinery Directive 89/392/EEC and 93/44/EEC or EN60204 part 1 »Electrical Equipment of Machinery«, para 9.4.3.1).

**Typical applications:**

- Process control (steel industry)
- Power engineering (power plants)

## SPR10-T

### Description

The SPR10-T Smart Power Relay was designed for DC 12 V and DC 24 V applications. Unlike conventional relays the SPR10-T offers overcurrent protection as an integral feature. The new SPR10-T switches powerful loads and protects all loads effectively against overcurrents. The combination of four functions (relay, overcurrent protection, diagnosis and power distribution) in a single device allows space savings and reduction of complexity and minimises storage costs.

**Typical applications:**

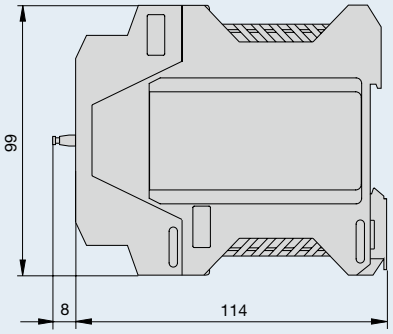
- Automation
- Car production
- Utility vehicles
- Steel industry

For information on solid state remote power controllers please visit: **www.e-t-a.de/e500**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | max. 3 A |
| **Current limitation** | typically 2 x $I_N$ |
| **Ambient temperature** | 0 °C ... +50 °C |
| **For more information please visit** | www.e-t-a.de/e507 |

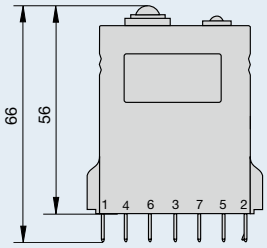
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Rated current** | version 1: 1 A, 2 A, 3 A, 5 A, 7.5 A, 10 A<br>version 2: 15 A / 20 A |
| **Current limitation** | typically 75 A (version 1)<br>typically 350 A (version 2) |
| **Ambient temperature** | -40 °C ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e503 |

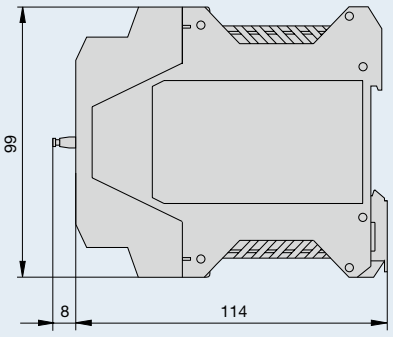
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | 50 mA ... 3.0 A |
| **Current limitation** | approx. 12 A |
| **Ambient temperature** | 0 °C ... +50 °C |
| **For more information please visit** | www.e-t-a.de/e506 |

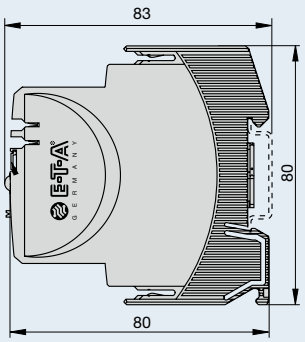
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12/DC 24 V |
| **Max. voltage** | DC 32 V |
| **Max. overload** | 200 A |
| **Ambient temperature** | -40 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e508 |

## Dimensions



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# Conventional power distribution

## Power distribution modules and power distribution systems for rail mounting

Power distribution systems and modules for protection against overcurrent are ideally suited to the design of compact power supply units. They are typically installed in control cabinets or decentralised power distribution units where the overcurrent protection is connected to a joint supply unit. The individually usable overcurrent protection will protect individual loads and their supply cables against the consequential damages of overcurrent and short circuit.

The power distribution systems Module 17plus and Module 18plus can mounted side by side in a modular design and therefore require very little space. These solutions are suitable for direct rail mounting and offer a complete mounting and power distribution system. They are freely configurable on site and are perfectly suited for wiring and protecting all loads and their supply lines.

The flexible SVS power distribution systems can be individually adjusted to the application in question. The solution will the sit as a complete unit directly on the DIN rail. Power distribution from a DC 24 V switch mode power supply to several slots works with the help of printed circuit board technology. The required plug-in type circuit breakers are available in many different versions. We can thus ensure the best possible protection of the connected load and its supply line.

## Power distribution systems for 19” racks and control cabinet systems

We offer customised solutions for power distribution and protection, tailor-made to customer's requirements. To achieve this goal, we efficiently combine all elements for power distribution and protection in a single unit.

Tailor-made to the corresponding application, we offer standardised series products as well as individual solutions for complex tasks. Our solutions speak for themselves through integral protection, ease of installation, minimum space requirements and cost-effectiveness. Our well-proven modular system allows accommodation of maximum performance in minimum space.

**Applications**

- Vehicles (AC 230 V, AC 400 V, DC 12 V, DC 24 V, DC 48 V, DC 400 V)
- Automation (AC 230 V, AC 400 V, DC 24 V, DC 48 V, DC 400 V)
- Telecommunications (AC 230 V, AC 400 V, minus DC 48 V, minus DC 65 V, minus DC 400 V)

**Solutions**

- ***Power-D-Box***® Systems
- Power Distribution Modules
- Power Board Modules

# Power distribution modules and systems

## Compact, flexible and cost-effective

**Module 17plus and 18plus power distribution systems**
The power distribution modules 17plus and 18plus combine selective overcurrent protection with a flexible, modular power distribution in load circuits. These solutions are flexible, can easily be adjusted individually and are therefore extremely cost-effective.

**Your benefits:**
**Module 17plus and Module 18plus**
- Their modular design provides flexibility
- Individual adjustment to the application helps to reduce costs
- Fast and centralised wiring helps to reduce wiring time
- Their small width helps to save installation space

**SVS power distribution systems**
The SVS power distribution systems combine selective overcurrent protection with the power distribution in load circuits and provide a compact solution within a single system. This is what makes SVS solutions so efficient and cost-effective.

**Your benefits:**
**SVS power distribution systems**
- save costs by reducing wiring efforts and by reducing the number of components
- save space through a compact and centralised distribution in a single component
- save time through a consistent design concept and the clear structure of the power distribution

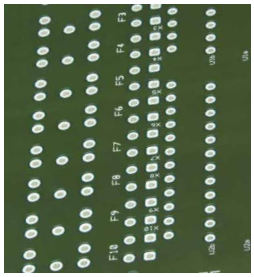
For information on power distribution modules and systems please visit: **www.e-t-a.de/e600**

**Module 18plus**
optionally fitted with
- ESS30-S
- ESX10
- 2210-S

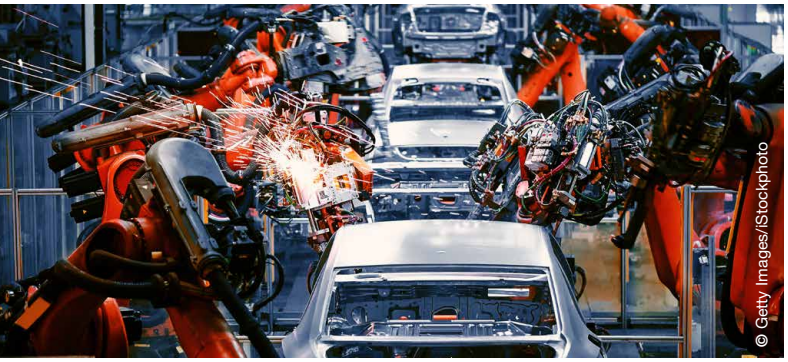
18plus-EM
supply module

18plus-AM
connection module

**Power distribution systems SVS**
optionally fitted with
- ESS30-S
- ESX10
- 2210-S



printed circuit board






18plus-SM
signalling module

=

Module 18plus
power distribution system

**Power distribution system**
**Module 18plus compact system**
optionally fitted with
- ESS30-S electronic circuit breakers
- ESX10 electronic circuit protectors
- 2210-S thermal-magnetic circuit breakers

Supply terminals PLUS connection terminals PLUS signal terminals PLUS integral cable harness PLUS flexible circuit breaker population:

More than 18 positive features mutually supplement their effects!

connector

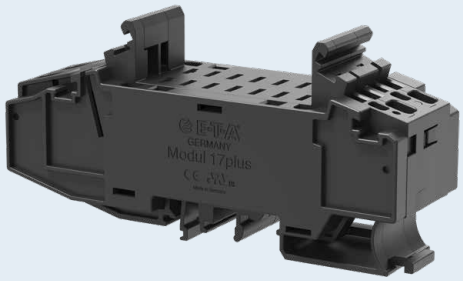
=

power distribution
system

**Power distribution system**
optionally fitted with
- ESS30-S electronic circuit breakers
- ESX10 electronic circuit protectors
- 2210-S thermal-magnetic circuit breakers

# Power distribution modules and systems

## Module 17plus




## Description

The Module 17plus is a mounting and power distribution system which is used in combination with the following devices:

- 2210-S, 3600, 3900 circuit breakers
- ESS30 electronic circuit breakers and ESX10 electronic circuit protectors
- E-1048-S7... solid state remote power controller

It consists of individual components accommodating two each single pole circuit breakers or overcurrent protection devices with a width of 12.5 mm. These will be plugged into the Module 17plus, DIN rail which will be snapped onto a symmetrical rail.

## Module 18plus

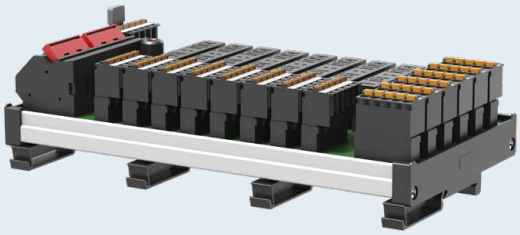
## Description

The new Module 18plus power distribution system is a compact wiring solution for all load and signal lines of the DC 24 V control voltage, no matter whether it is a decentralised power distribution or a centralised system concept. The system accommodates various E-T-A circuit breakers and overcurrent protectors and holds a complete mounting and power distribution system with state-of-the-art push-in technology for DIN rail mounting.

**Accommodating**

- 2210-S
- ESS30, ESX10

## SVS04



## Description

The SVS04 power distribution board for DIN rail mounting distributes the current fed in by a switch mode power supply to four or eight slots. It selectively protects the connected loads by means of the inserted circuit breakers. The SVS04 simplifies wiring and distribution with a load current of 8 A per way and a max. total current of 40 A in short-circuit-limited DC 24 V applications. Five protected »L+« load outputs per slot and 15 or 300 minus terminals help to significantly reduce the otherwise usual wiring time.

**Accommodating:**

- 2210-S, ESS30, ESX10

## SVS25

## Description

The SVS25 power distribution system meets all requirements of the automation technology with regard to reliable overcurrent protection and optimised current distribution. It is designed for rail mounting and distributes the voltage potentials supplied by a DC 24 V switch mode power supply to eight slots. At the same time it selectively protects the connected loads by means of the plugged in REF16-S101-DC24V electronic circuit protector. Ten protected »+« load outputs and ten minus terminals per slot help to significantly reduce wiring time.

**Accommodating:**

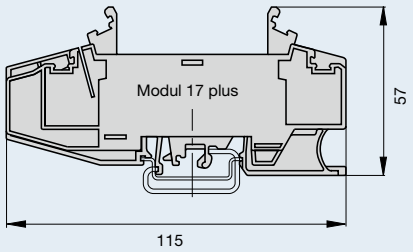
- REF16

For information on power distribution modules and systems please visit: **www.e-t-a.de/e600**

## Technical data

| | |
|---|---|
| **Voltage ratings** | AC 250 V; 3 AC 433 V; DC 65 V (without circuit breakers) |
| **Rated current** | via power distribution busbar max. 50 A<br>per slot max. 25 A |
| **Signalling** | group signalling max. 10 A<br>max. 1 A per way |
| **For more information please visit** | www.e-t-a.de/e601 |

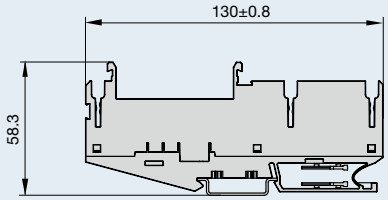
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | max. 20 A |
| **Signalling** | make contacts connected in series |
| **For more information please visit** | www.e-t-a.de/e602 |

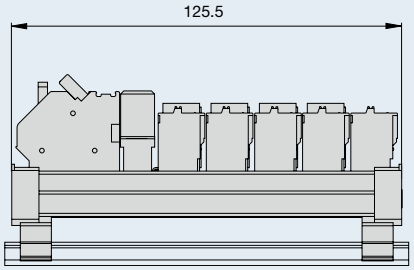
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V |
| **Rated current** | max. 40 A |
| **Signalling** | group and split-up group signalisation DC 30 V/0.5 max. signal outputs pre-wired on pcb |
| **For more information please visit** | www.e-t-a.de/e603 |

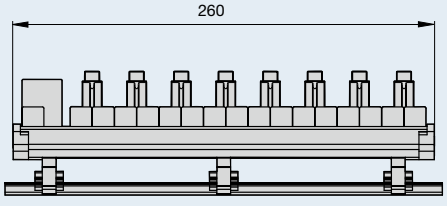
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 24 V (18 ... 30 V) |
| **Rated current** | max. 40 A |
| **Signalling** | group signalling<br>DC 24 V/max. 0.5 A |
| **For more information please visit** | www.e-t-a.de/e604 |

## Dimensions



# Power Board Modules

## From a single component to pcb-based power distribution systems and central electrics

In the sector of automotive engineering we design and sell flexible solutions up to central electrics. We provide you with tailor-made complete solutions for power distribution and protection. Just as you please.

**Benefits**

- Reduced complexity
- Ergonomic design, user convenience and enhanced reliability through CAN communication
- One solution for switching, monitoring and power management
- Significant space savings compared to single components
- Upon request we also supply plug-in solutions including cable harness

**Applications**

- Construction machinery
- Agricultural machinery
- Special vehicles
- Platform manufacturers for small transporters, trucks and trailers

**Engineering**

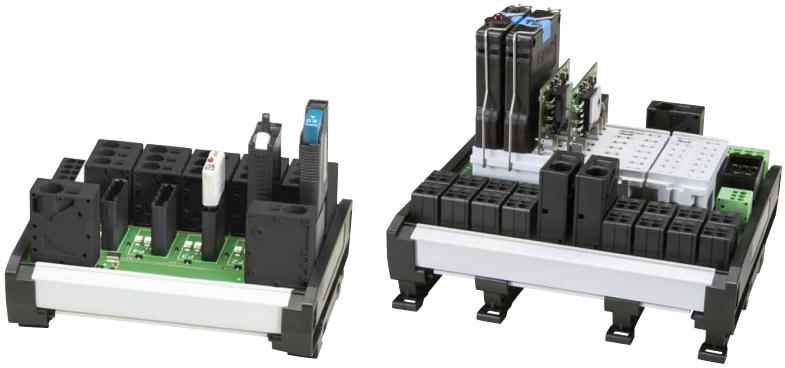
Our solutions are suitable for use in nearly all voltage levels – AC 12 V, AC 24 V, DC 48 V, DC 400 V, DC 230 V, DC 400 V – for a range of current ratings.

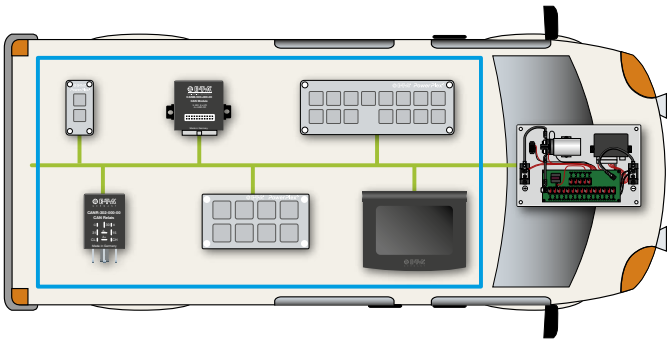
Power Board Modules help save space through their extremely compact pcb technology. We rely on technologies such as thick film copper, 4- or 6-layer printed circuit boards and optimised press-fit engineering.

**Tailor-made to your application**

- For the use in highly standardised control cabinets in line with automotive requirements, the Power Board Modules are mounted on DIN rails
- For individual mounting requirements the Power Board Modules offer adapter solutions from an artless metal bracket up to enclosure types with high protection degrees

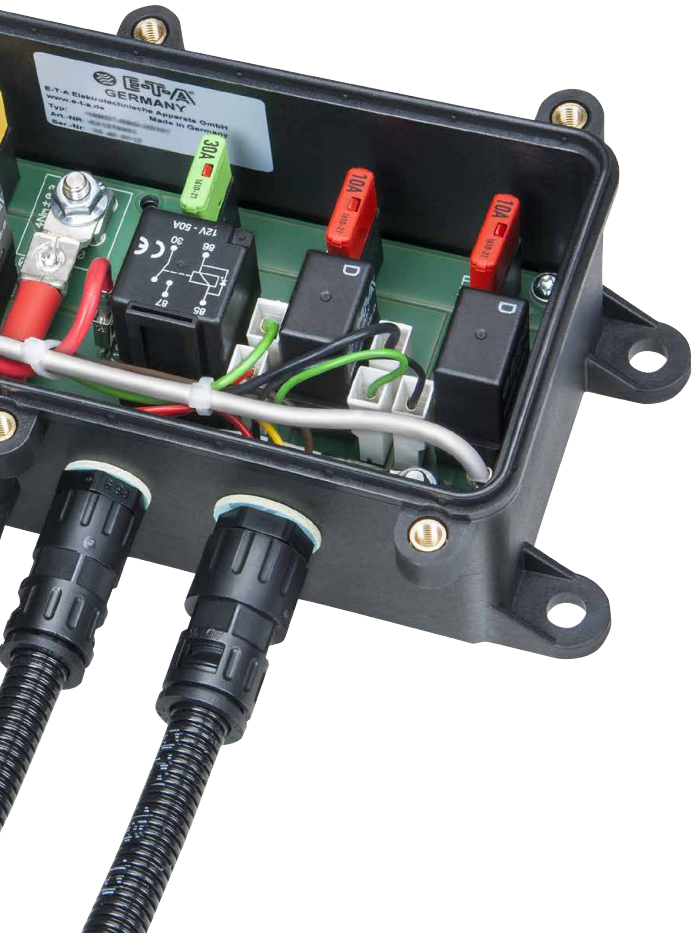
For information on power board modules please visit: **www.e-t-a.de/e650**






Application examples for Power Board Modules in automotive engineering on the score of central electrics and CAN-bus-controlled protection modules.



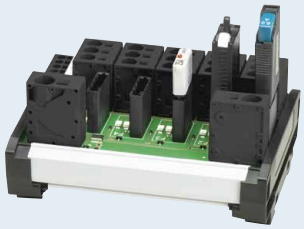

**Your benefits**

- Unburden your own R&D resources
- Plug & play solutions
- Mounting adapters can be freely configured according to a customer specification or modules are track-mountable
- High degree of individualisation
- In-depth consideration of your design requirements

The Power Board Modules are designed and developed according to customer specifications for utility vehicle applications. Enclosures with a high protection degree can be mounted on the vehicle's chassis.

# Power Board Modules

## PBM-V0060



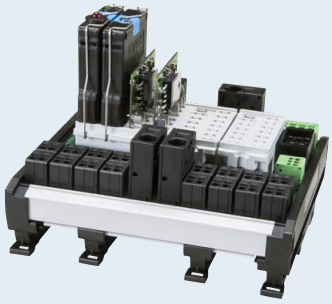
### Description

The power distribution system has been designed to accommodate plug-in type thermal circuit breakers type 1170-21, 1180 and 1610. It is a printed circuit board module for rail mounting. Set-up is also possible on a customer-specific adapter mount. Group signalisation is created via the power distribution board and made available as potential-free contact. Load terminals are designed as standard terminal blocks.

**Typical applications:**

- Construction machinery
- Agricultural machinery
- Special vehicles

## PBM-V0089



### Description

The power distribution board has been designed to accommodate the plug-in type smart power relays E-1048-8I or -8S. It is a printed circuit board module for rail mounting. Set-up is also possible on a customer-specific adapter mount. Single or group signalisation is created via the power distribution board and made available as potential-free contact. Load terminals are designed as standard terminal blocks.

**Typical applications:**

- Construction machinery
- Agricultural machinery
- Special vehicles

## PBM-V0126

### Description

Tailor-made customised complete solution as a power distribution system for accommodation of thermal plug-in type circuit breakers and/or relays of various E-T-A product series. The system can be supplied completely ready-made for harsh environmental conditions, for a high IP protection degree, high shock and vibrations requirements and upon request also with a plug-in cable harness. The power distribution system is designed as a printed circuit board module with/without single or group signalisation, potential-free or via bus technology.

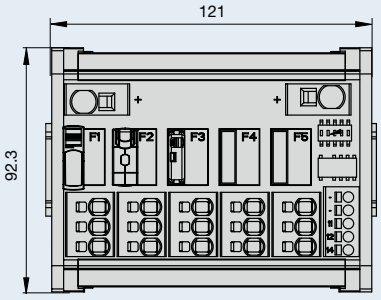
Upon request, we are able to offer interesting solution ideas.

For information on power board modules please visit: **www.e-t-a.de/e650**

## Technical data

| | |
|---|---|
| **Voltage ratings** | max. DC 24 V |
| **Rated current** | total current 75 A<br>individual load: max. 25 A |
| **Number of load channels** | 1 x 5 |
| **Cable cross sections** | supply max. 16 $mm^2$<br>load max. 6 $mm^2$ |
| **For more information please visit** | www.e-t-a.de/e652 |

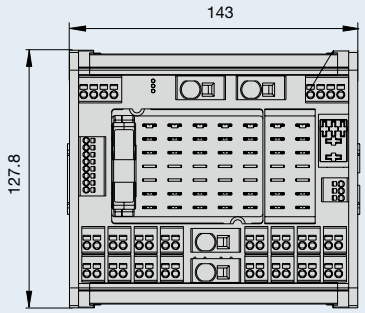
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | max. DC 24 V |
| **Rated current** | total current: max. 75 A<br>individual load: max. 25 A |
| **Number of load channels** | 1 x 8<br>2 x 4 |
| **Cable cross sections** | supply max. 16 $mm^2$<br>load max. 2.5 $mm^2$ |
| **For more information please visit** | www.e-t-a.de/e653 |

## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | max. DC 48 V |
| **Rated current** | total current typically max. 100 A<br>individual load typically max. 25 A |
| **Number of load channels** | customised |
| **Cable cross sections** | customised |

# *Power-D-Box®* Systems

## From a single to component over sub-distribution to the entire control cabinet

**A wealth of possibilities**

- The power distribution systems ***Power-D-Box®*** and Power Distribution Modules ensure an optimised power distribution, selective overcurrent protection and intelligent signalling on printed circuit board basis.
- ***Power-D-Box®*** and Power Distribution Modules in a 19“ design can entirely be tailored to customers’ needs. According to the »plug and play« principle, they only have to be connected.
- We also offer complete control cabinet solutions which provide even more compact accommodation of your power distribution systems, e.g. as a so-called ***BonsaiCabinet®***.

**Successful in many markets**

Chemical industry, foodstuffs and pharmaceutical industry, power engineering and power plants (signalling and transmission technique), oil and gas, car production, data centres and telecommunications: These are the key industries for our applications.

Our application experts ensure practice-oriented knowledge and guidance and will work out an individual protection concept. This implies ultimate technical and economic advantages with unrivalled reliability.

**Engineering**

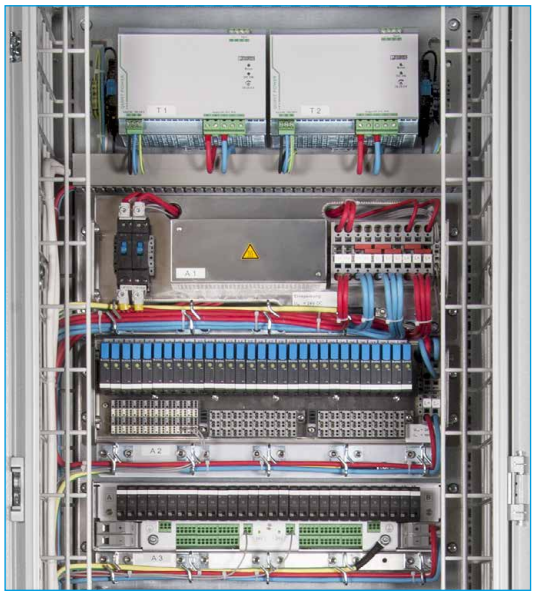
Our system solutions are suitable for the voltage levels AC 230 V, AC 400 V, DC 24 V, DC 48 V, DC 400 V, minus DC 48 V, minus DC 65 V, minus DC 400 V at various current ratings. The system solutions of our series ***Power-D-Box®*** and Power Distribution Module enable a compact power distribution, where the aspects safety, clear layout and space-saving design as well as redundancy and selectivity are our major requirements.

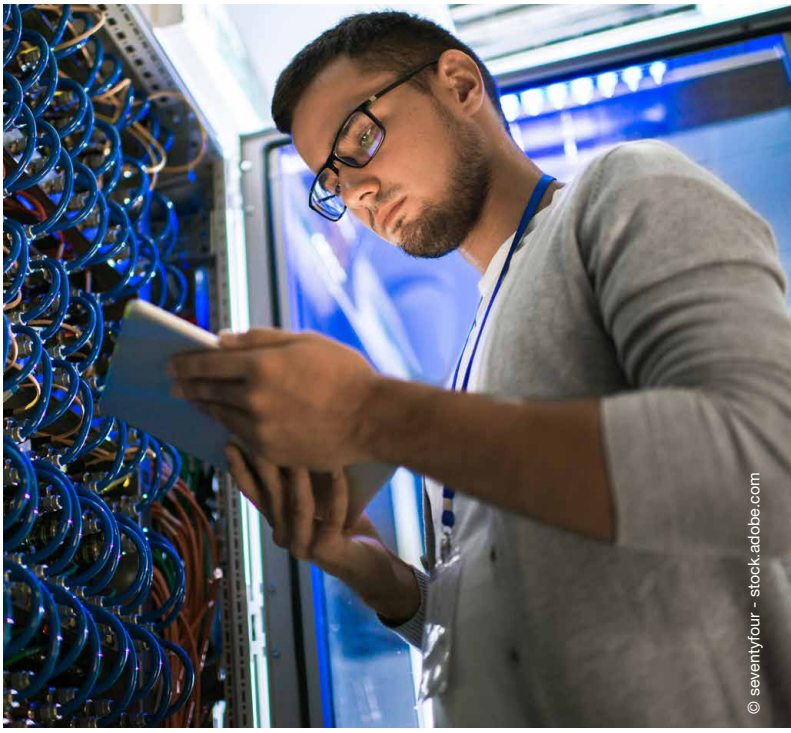
The modular design allows flexible, reliable and easy extension of our power distribution systems, which can also be integrated into our control cabinet series SBG-T.

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.

For information on ***Power-D-Box®*** please visit: **www.e-t-a.de/e700**

Various plug-in type protective elements ESS30, ESX10-S, 2210-S, 3600




**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

Power distribution systems out of the construction kit can exactly be tailored to your needs.

They contain:

- cable organisers in a well-proven design
- optional total current display
- load terminals in push-in technology
- compact wiring by means of pcb
- decoupling diodes with integral heat sink
- reversible mounting flanges for 19” racks or backplane mounting

The modular system massively reduces project run time.

# *Power-D-Box®* Systems

## PDB – printed circuit board

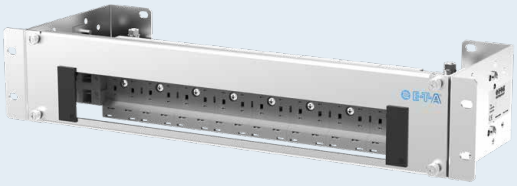
## Description

The 2U ***Power-D-Box®*** with pcb accommodates 3600, 3900, 2210 (1-pole or 2-pole) and 2216 plug-in type thermal-magnetic circuit breakers,the ESX10 and REF16 electronic circuit protectors and the ESS30 electronic circuit breakers. The group signalisation and the entire conduits feature a compact pcb design. Connection is by means of terminals directly on the circuit board or via additional terminals. Voltage display or junction of two redundant supply lines via de-coupling diodes are available as an option.

**Typical applications:**

- Process control

## PDB – Economy



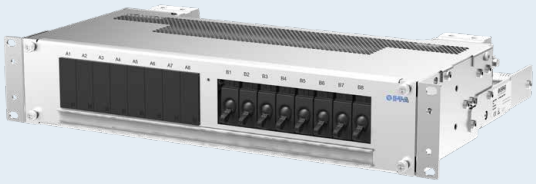
## Description

The Economy ***Power-D-Box®*** is a compact 2RU power distribution system (2 rack units). The redundantly designed system accommodates 8335 or 8340-F magnetic hydraulic-magnetic plug-in type circuit breakers. The busbars as well as the group signalisation are insulated in a moulded enclosure, so that live parts cannot be touched. Connection of loads is from the front via blade terminals which are protected against reverse polarity. Besides various preferred types, we can offer individual solutions, perfectly tailored to your application.

**Typical applications:**

- Telecommunications

## PDB – High Power



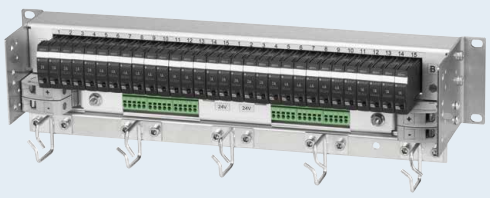
## Description

The High ***Power-D-Box®*** is a compact 2RU power distribution system (2 rack units). The redundantly designed system accommodates 8345 hydraulic-magnetic plug-in type circuit breakers. The entire circuitry as well as the group signalisation are placed in a metal enclosure, protected against brush contact, so that live parts cannot be touched. Depending on the application, the loads can be connected on the rear or on the front by means of screw terminals. Besides various preferred types, we can offer individual solutions, perfectly tailored to your application.

**Typical applications:**

- Process control
- Power Telecommunications

## PDM



## Description

The 2U Power Distribution Module with pcb accommodates the 3600, 3900, 2210 (1-pole or 2-pole) and 2216 plug-in type thermal-magnetic circuit breakers, the ESX10 and REF 16 electronic circuit protectors and the ESS30 electronic circuit breakers. The group signalisation and the entire conduits feature a compact pcb design. Connection is via spring-loaded terminals or supply feed is on screw terminals. Cable organisers, voltage display or junction of two redundant supply lines via de-coupling diodes are available as an option.

**Typical applications:**

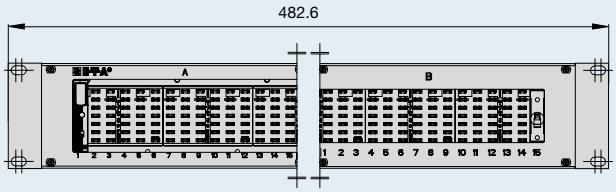
- Process control

For information on ***Power-D-Box***® systems please visit: **www.e-t-a.de/e700**

## Technical data

| | |
|---|---|
| **Voltage ratings** | max. AC 50 V/230 V<br>max. DC 65 V |
| **Rated current** | total current: max. 100 A/80 A<br>individual load: max. 16 A |
| **Number of ways** | max. 1 x 30<br>max. 2 x 15 redundant |
| **Cable cross sections** | supply max. 35 mm²<br>load max. 2.5 mm² |
| **For more information please visit** | www.e-t-a.de/e701 |

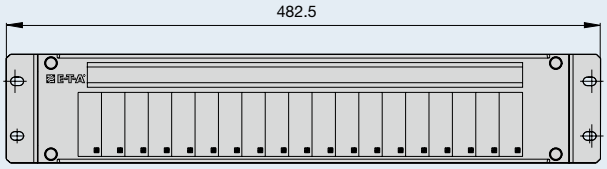
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | max. DC 80 V |
| **Rated current** | total current: max. 132 A<br>max. 25 A per way<br>(30 A upon request) |
| **Number of ways** | 1 x 18<br>2 x 8 |
| **Cable cross sections** | supply max. 50 mm²<br>load max. 6 mm² |
| **For more information please visit** | www.e-t-a.de/e702 |

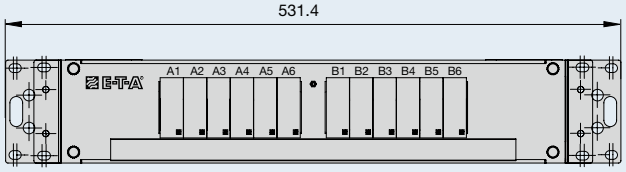
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | max. DC 80 V |
| **Rated current** | total current: max. 232 A<br>individual load: max. 125 A |
| **Number of ways** | 1 x 18<br>2 x 8 |
| **Cable cross sections** | supply max. 95 mm²<br>load max. 35 mm² |
| **For more information please visit** | www.e-t-a.de/e703 |

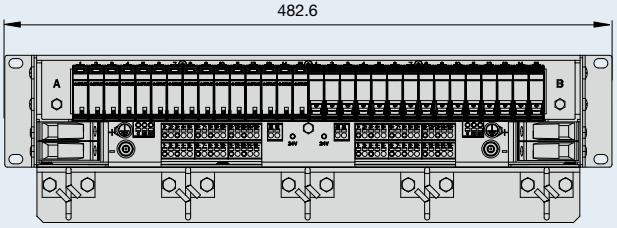
## Dimensions

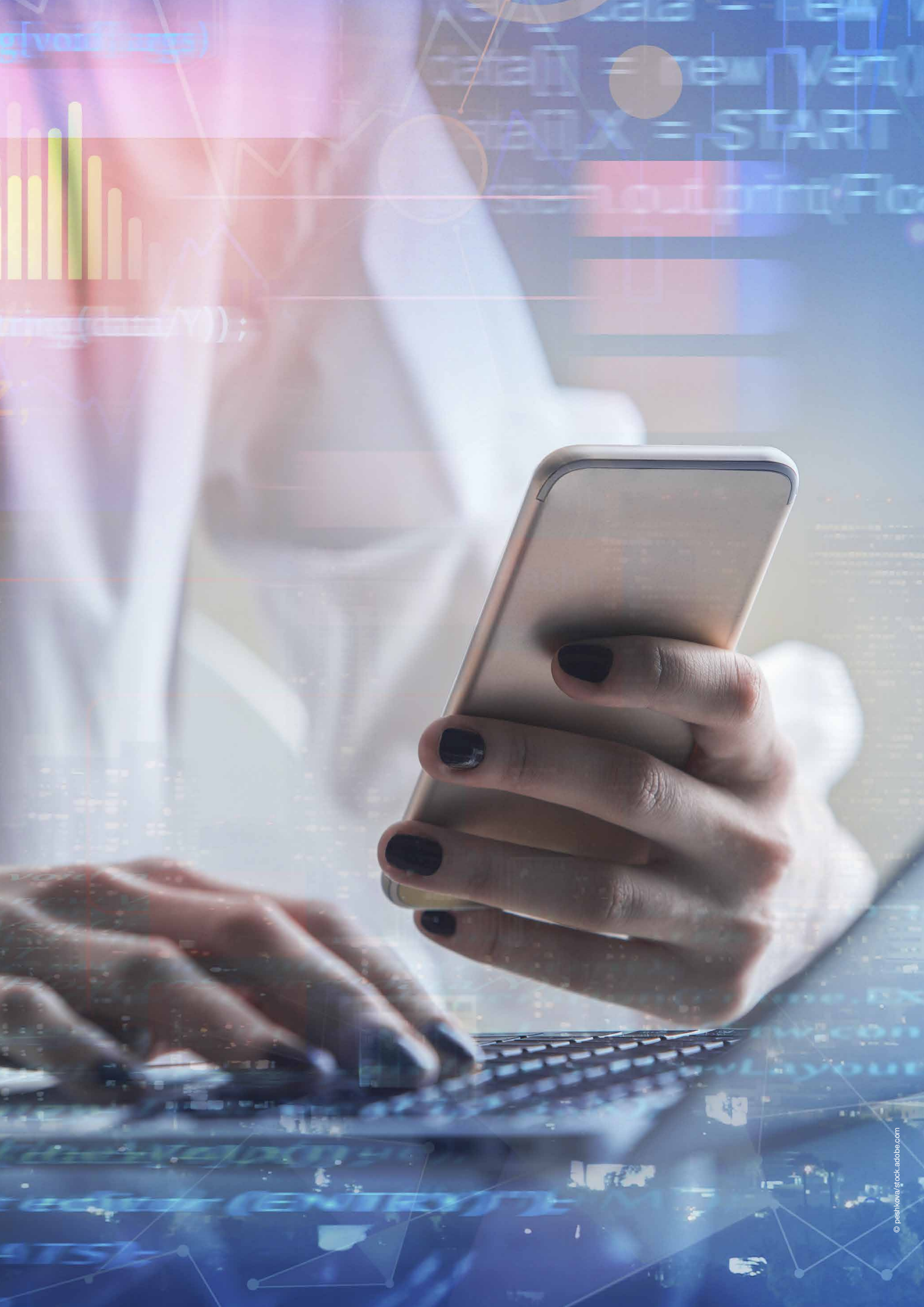



## Technical data

| | |
|---|---|
| **Voltage ratings** | max. AC 50 V<br>max. DC 50 V |
| **Rated current** | total current: max. 100 A<br>individual load: max. 16 A |
| **Number of ways** | 1 x 30<br>2 x 15 redundant |
| **Cable cross sections** | supply max. 35 mm²<br>load max. 2.5 mm² |
| **For more information please visit** | www.e-t-a.de/e704 |

## Dimensions





# Intelligent power distribution

## SCS Smart Control Systems® for vehicles

**SCS Smart Control Systems®** is the intelligent solution for power distribution in vehicles with CAN communication.

Comprehensive diagnostic functions allow early failure detection and reduce or avoid consequential damages, breakdown and downtimes. Flexible and compact CAN mini control units allow quick and easy extension of existing CAN networks.

**Applications**
- Trucks
- Buses
- Agricultural vehicles and forestry equipment
- Construction machinery
- Special vehicles

## *ControlPlex*® DINrail for process control and automation

The flexible ***ControlPlex*® DINrail** are intelligent power distribution and protection solutions for direct rail mounting. Their modular design allows easy adjustment and extension.

The connection to a superordinate control system such as IO link or Modbus RTU makes your DC 24 V supply transparent. Thanks to continuous data recording, unintended process standstills are prevented and machine uptime is increased.

**Applications**
- Machine construction and process control
- Process automation
- Building automation

## *ControlPlex*® Rack for data centres and telecommunications

***ControlPlex*® Rack** is the intelligent complete solution for power distribution and overcurrent protection in telecommunications, combined with smart control and monitoring technology. Thanks to selective protection, the modular system ensures unrivalled equipment uptime and provides the user with a convenient remote management in addition to recording performance data.

The ***ControlPlex*® Rack** is a tailor-made solution offered by E-T-A for power distribution and protection in compliance with customer requirements.

**Applications**
- Telecommunications (minus DC 48 V, minus DC 65 V)

**Solutions**
- ***ControlPlex*® Rack** systems

## *PowerPlex*® for boats and special vehicles

***PowerPlex*®** is a modular, CAN bus based control system allowing the realisation of intelligent on-board electrical systems on boats, in mobile homes and special vehicles.

Growing digitisation makes smart on-board electrical systems in watercraft and vehicles a topical subject in global competition. E-T-A's ***PowerPlex*®** offers an overall concept for interlinking and controlling the on-board equipment, significantly increasing user convenience and safety.

From intelligent control units with touchscreens to automatic sensors and manual momentary switches or smartphone and tablet applications – ***PowerPlex*®** puts the entire on-board electrical system under your thumb.

**Applications**
- Boats, yachts
- Caravans, motor homes
- Special vehicles

# SCS Smart Control Systems®

## Intelligent power distribution in vehicles with CAN communication

Digitisation is increasing more and more in the field of transportation. Modern vehicles and machines are fitted with numerous sensors and communication interfaces. CAN bus technology and the SAE J1939 network protocol based on the CAN 2.0B specification are the standard for networking components in commercial vehicles of all kinds.

The Smart Control Systems product group designed by E-T-A supports this standard. One of this technology's major advantages is that the number cables and all pertinent material and production costs can be reduced, because the switching elements are directly switched on or off via the CAN bus and diagnostic information can additionally be sent.

The SCS200 intelligent power distribution module provides comprehensive diagnostic information such as load current per channel, total current, voltage and output status as well as an overload alert. The diagnostic functions allow early failure detection and reduce or avoid consequential damages, breakdown and downtimes. Availability and productivity of the vehicle are increased. In addition, the information gained allows fast and efficient trouble-shooting during service and maintenance.

The flexible and compact CAN mini control units SCS10, SCS20 and SCS30 allow easy and quick extension of an existing CAN network. This is a major benefit for a great number of vehicle options. The products can just be plugged into standard automotive terminal blocks without additional wiring efforts.

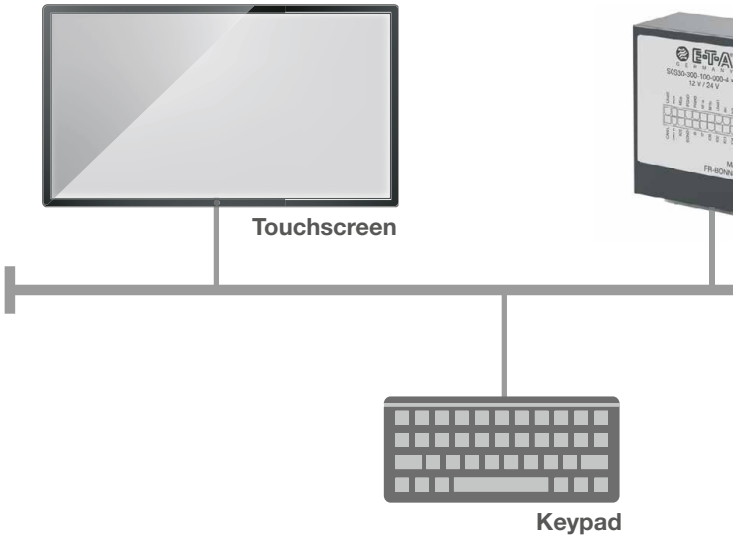
E-T-A CAN mini control units can be configured by means of a graphic programming environment. Besides the definition of CAN messages, a great number of logical links and timer functions are available.

First steps into the CAN world are easily possible with the SCS product group and our support.

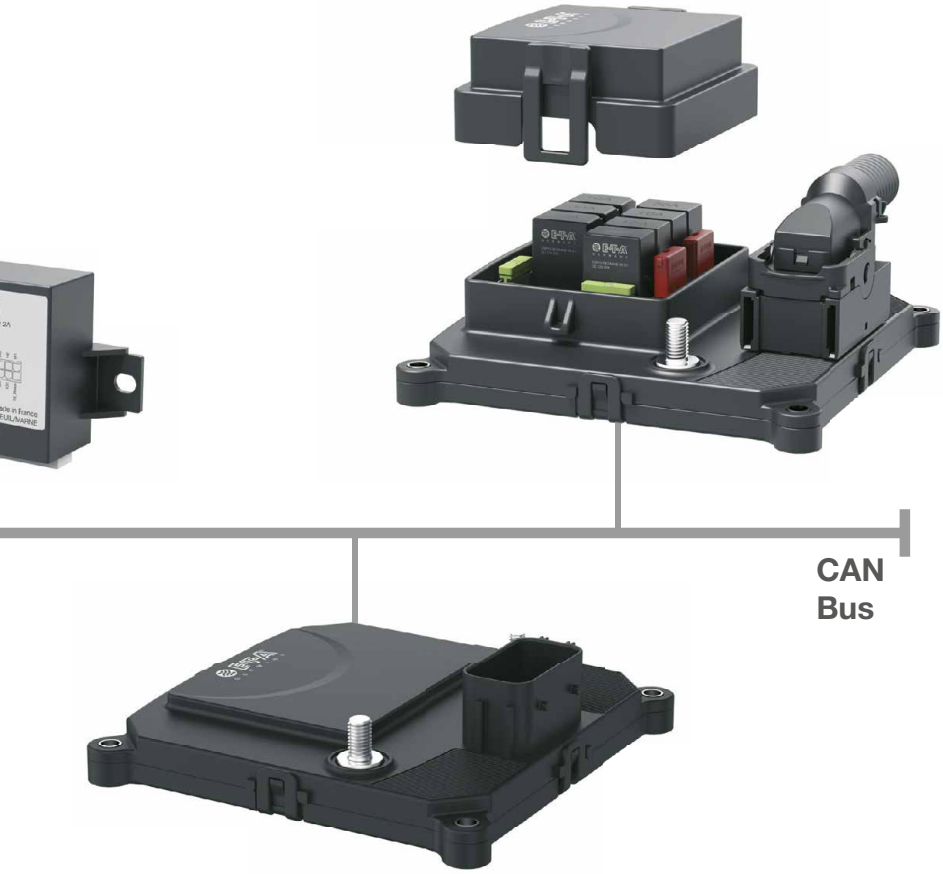
**Typical applications:**

- trucks
- buses
- agricultural and forestry equipment
- construction machinery
- special vehicles

For more information on **SCS Smart Contol Systems®** please visit: **www.e-t-a.de/e560**





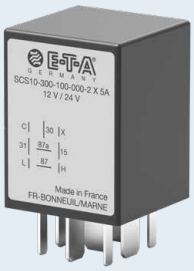

**Your benefits:**

- Versatile range of applications through ease of integration into existing CAN networks.
- Digitisation of the on-board electrical system by CAN interfaces
- Enhanced reliability and load management by way of diagnostic functions

**SCS® Smart Control Systems** access the CAN bus technology and the network protocol SAE J1939 for connecting components in utility vehicles. They are the basis of the CAN 2.0 specification.

# SCS Smart Control Systems®

## SCS10



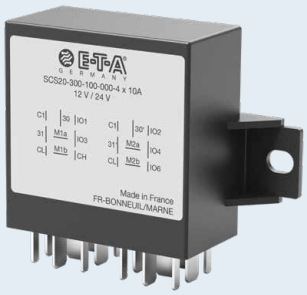

## Description

The smart SCS10 relay belongs to smallest components of the SCS product group. This CAN mini control unit can easily be included in existing systems via a customer-specific software.

The SCS10 stands out due to a versatile range of applications, e.g. supplementing sensors, use of voltage monitors or controlling fans and hydraulic valves with dithering function.

- 2 HSD outputs
- 2 analog inputs
- CAN communication

## SCS20



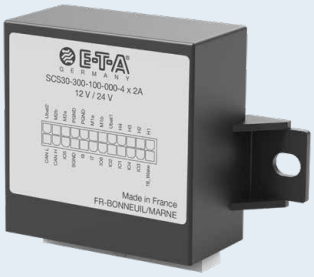

## Description

The smart SCS20 module is a universally usable CAN mini control unit in a modular housing with blade terminals. Via a customer-specific software, this component can easily be included in existing systems.

A particular feature of the SCS20 is its 12 interfaces and additional CAN communication.

- 6 IO ports
- 2 low-power outputs
- 2 H-bridge
- CAN communication

## SCS30




## Description

The smart SCS30 module is a universally usable CAN mini control unit in a modular housing with terminal rail. Via a customer-specific software, this component can easily be included in existing systems.

A particular feature of the SCS20 is its 14 interfaces and additional CAN communication.

- 6 IO ports
- 4 low-power outputs
- 2 H-bridge
- CAN communication

## SCS200

## Description

It is an intelligent power distribution system, allowing decentralised control and monitoring of loads via the CAN bus. The design features a pcb-based power distribution in a compact IP67 enclosure. This plug-and-play solution helps you reduce the wiring efforts and save space. Diagnostic capabilities and integral CAN connection ensure reliability and connectivity at the same time.

**Diagnostic functions:**

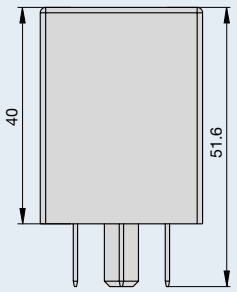
- load current
- total current
- voltage
- output status
- overload alert

For information on **SCS Smart Control Systems®** please visit: **www.e-t-a.de/e560**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/24 V |
| **Continuous current** | 2 A, 3 A, 5 A |
| **Outputs** | 2 HSD outputs + CAN bus |
| **Terminal design** | ISO 7588 MINI |
| **Ambient temperature** | -40 °C ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e561 |

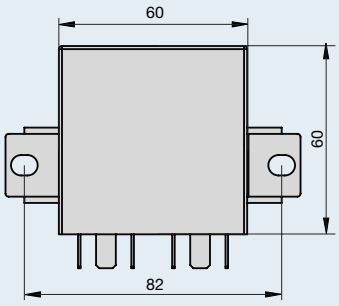
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/24 V |
| **Continuous current** | 10 A |
| **Inputs/outputs** | 6 IO ports<br>4 outputs @ 10 A<br>CAN high, CAN low |
| **Terminal design** | blade terminals |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e562 |

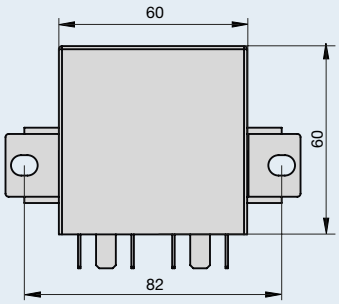
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/24 V |
| **Continuous current** | 1 A, 2 A |
| **Inputs/outputs** | 6 IO ports<br>4 outputs @ 1 A<br>CAN high, CAN low |
| **Terminal design** | multipole plug |
| **Ambient temperature** | -40 ... +85 °C |
| **For more information please visit** | www.e-t-a.de/e563 |

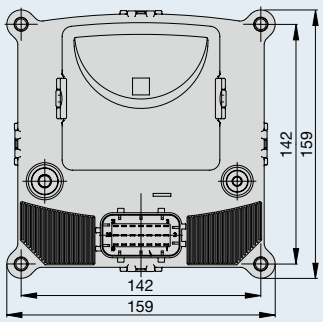
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V/24 V |
| **Max. load current per channel** | 4 x 30 A<br>all other channels 10 A |
| **Analog inputs** | 6 |
| **CAN-Standard** | SAE J1939, CAN 2.0 B |
| **Degree of protection** | IP66/IP67 |
| **Ambient temperature** | -40 ... +85 °C |

## Dimensions



# *ControlPlex*® DINrail EM12D

## System transparency and remote access for machine and panel builders

The requirements regarding modern machinery and equipment are constantly growing. Therefore system transparency, remote maintenance and remote access have become competitive edges.

Early notification in the event of any disturbances and a fast response to current problems will increase system availability, save costs and improve the overall stability of the production process.

E-T-A provides the ideal solution for machine and panel builders with the intelligent protection system comprising the REX12D circuit protector and the EM12D interface module. The system combines the well-proven quality of DC 24 V overcurrent protection with the communication options of IO link and Modbus RTU.

It allows complete transparency of the DC 24 V power supply and provides all necessary information for a reliable production process in this plant sector. The new generation of electronic overcurrent protection REX12D consists of the EM12D intelligent supply module and the REX12D-T electronic circuit protector, available as single or double channel model, in a modular design.

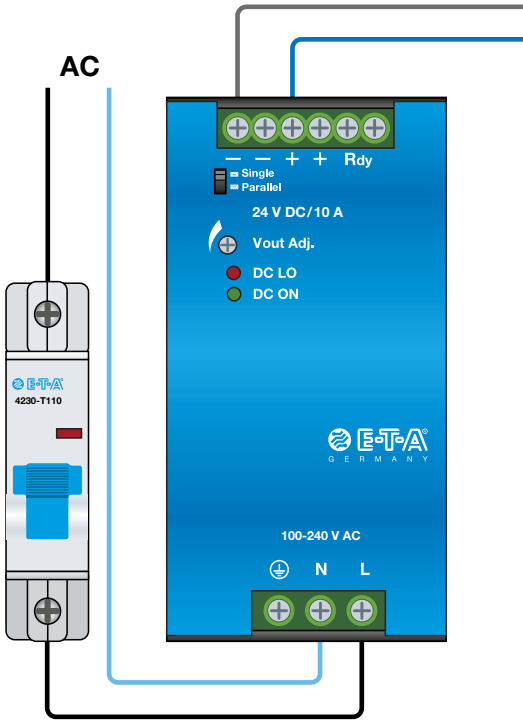
**Features and Benefits**

- Control, diagnosis and monitoring via IO link and Modbus RTU
- Selective load protection by means of electronic trip curve
- No accessories required for connecting the components
- Width per channel only 6.25 mm (2-channel)
- Fixed current ratings 2 A, 4 A, 6 A, 8 A and 10 A and adjustable current ratings 1 A – 4 A NEC Class 2 and 1 A – 10 A
- Switching capacitive loads up to 20,000 µF
- Manual ON/OFF/reset momentary switch
- Connection via push-in terminals including press release buttons

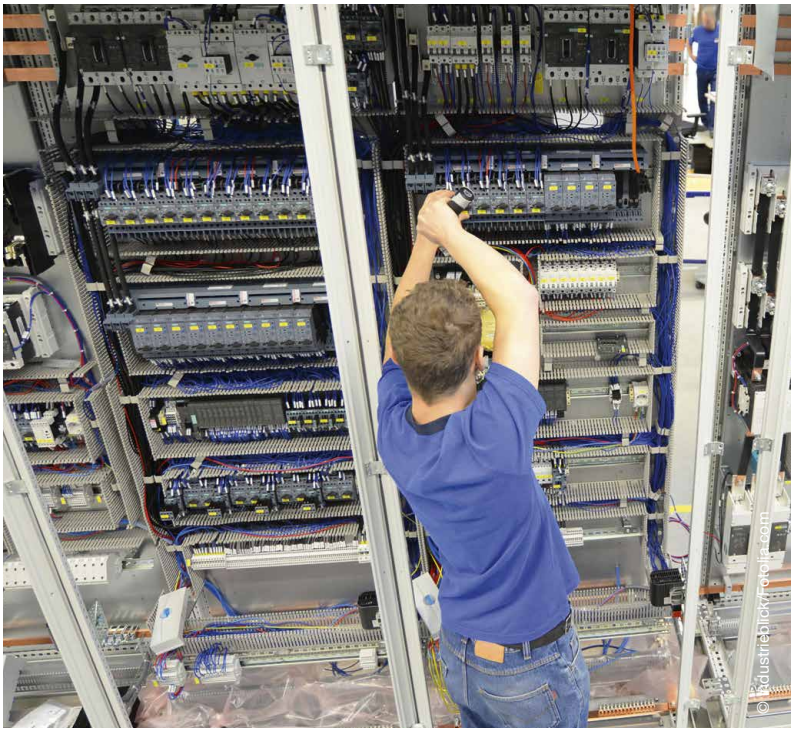
**Benefits:**

- Increases machine availability through high transparency and remote diagnosis
- Saves cost – no further accessories required
- Saves time through innovative and flexible mounting and connection technology
- Saves space – with a width of only 6.25 mm per channel
- High flexibility through easy adjustment of the current ratings from 1 A to 10 A

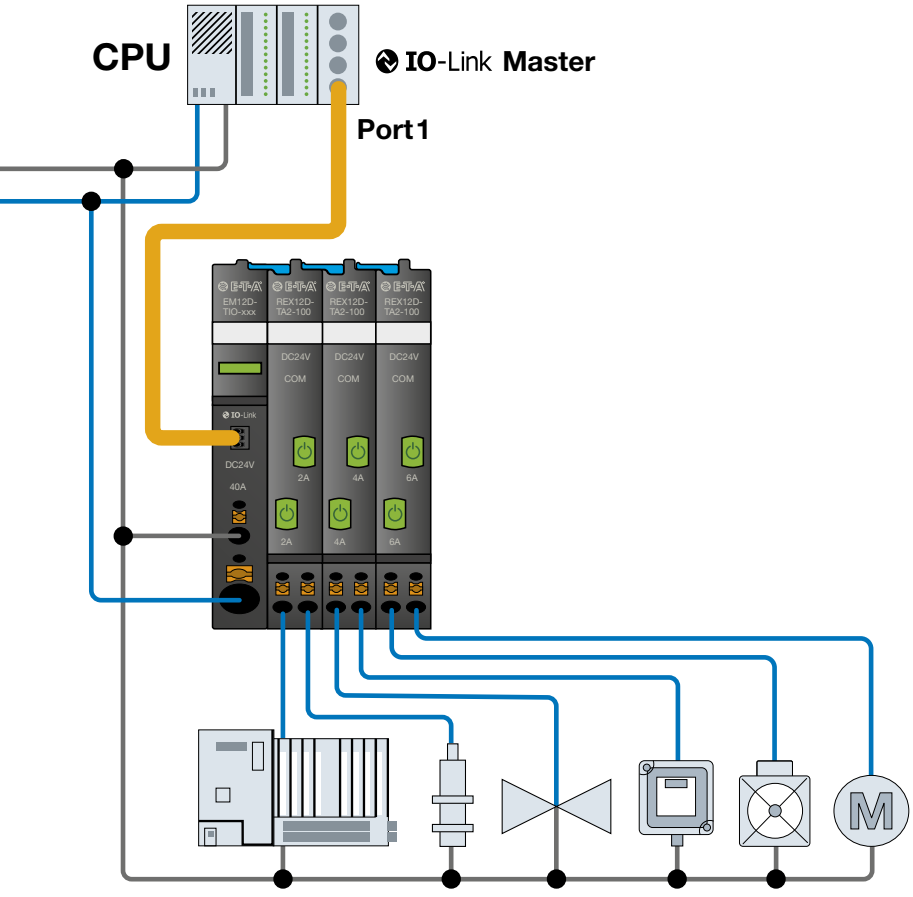
For information on ***ControlPlex***® **DINrail** please visit: **www.e-t-a.de/e750**






## Your smart DC 24 V protection with IO-Link and Modbus RTU




The system offers a quick and comprehensive diagnosis of your DC 24 V power supply. It enhances system transparency and significantly increases machine uptime.

IO-Link

Modbus

**Depicted:**
**connection to IO link**

# *ControlPlex*® DINrail EM12D

## EM12D smart supply module

## Description

The EM12D intelligent supply module receives the DC 24 V voltage supply voltage, e.g. from a switched mode power supply, and distributes it to the installed circuit protectors via the integral connector arm of the REX12D The EM12D intelligent supply module allows transmission of a great number of measuring values, diagnostic information and control commands to a superordinate IO link master or Modbus master of the control level. They include:

**Reading of measuring values**
- Status / event of device
- Load voltage
- Load current

**Control commands**
- Load output ON, OFF or reset

In combination with REX12D electronic circuit protector

## PM12D potential module

## Description

The PM12D power distribution concept of the REX system holds two main groups. In the same system, the user can easily realise not only the plus DC 24 V distribution, but also the minus distribution 0 V (GND).

**Typical applications:**
- Machine construction

## REX12D electronic circuit protector

## Description

The REX12D electronic circuit protector is only 12.5 mm wide and features push-in technology including press release buttons. It allows time-saving and maintenance-free wiring without any tools. And what is more: no additional accessories are required when connecting the individual components electrically and mechanically. This helps save time and money!

The devices are available with fixed current ratings 1 A, 2 A, 3 A, 4 A , 6 A, 8 A and 10 A. There are also devices with adjustable current current ratings firn 1 A to 4 A (NEC Class2) and 1 A to 10 A. In both cases this helps protect not only powerful loads, but also sensitive loads and very small cable cross sections. Failures can clearly be detected and remedied.

## *ControlPlex*® Tools

## Beschreibung

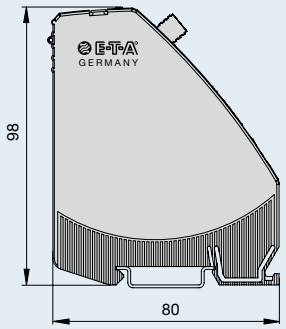
***ControlPlex*® Tools** comprises the necessary mechanical aids required for implementing the ***ControlPlex*® Board** into your control system. They are available for the engineering tools TwinCAT 3 made by Beckhoff and the TIA portal of Siemens. They also hold functional components for implementing the ***ControlPlex*® Board** into standard control units as well as templates for including the components into the visualisations.

For information on ***ControlPlex®*** **DINrail EM12D** please visit: **www.e-t-a.de/e750**

## Technical data

| | |
|---|---|
| **Operating voltage** | DC 24 V (18 ... 30 V) |
| **Rated current** | max. 40 A |
| **Closed current** | typically 20 mA |
| **Ambient temperature** | -25 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e750 |

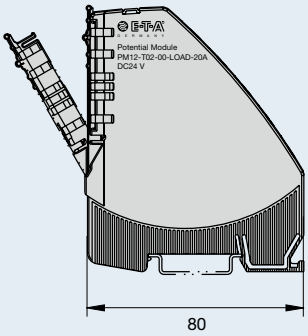
## Dimensions




## Technical data

| | |
|---|---|
| **Operating voltage** | DC 24 V (18 ... 30 V) |
| **Rated current** | max. 20 A |
| **Ambient temperature** | -25 ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e750 |

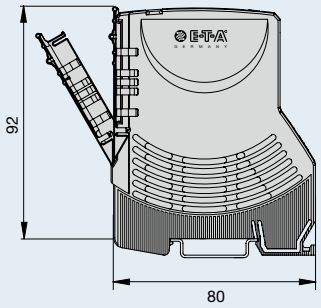
## Dimensions




## Technical data

| | |
|---|---|
| **Operating voltage** | DC 24 V (18 ... 30 V) |
| **Rated current** | single channel: 8 A, 10 A<br>double channel: 1 A/1 A, 2 A/2 A, 3 A/3 A, 4 A/4 A, 6 A/6 A 1A-10A |
| **Closed current** | in ON condition: max. 10 mA |
| **Ambient temperature** | -25 °C ... +60 °C (without condensation, cf. EN 60204-1) |
| **For more information please visit** | www.e-t-a.de/e751 |

## Dimensions



# *ControlPlex*® DINrail CPC20

## Intelligent DC 24 V power supply – protection included

Intelligent power distribution systems increasingly find their way into industrial production plants. Their major purpose is to increase system availability, to ensure stable production processes, to avoid undesired standstills and to provide flexibility of the plants in terms of predictive maintenance

This purpose is best served by the system's consistency from the field level to the cloud. System data are available everywhere and provide the required transparency. Undesirable developments can quickly be identified and rectified. This ensures stable production processes and a constant high quality.

Besides the PROFINET interface the system also will have an additional Ethernet interface which allows connection to OPC UA and MQTT (under preparation). The operator can also connect to the integral web server and retrieve and analyse all vital data of the DC 24 V power distribution.

**Features and Benefits**

- Permanent data logging and status monitoring
- Visualisation of recorded data
- **PROFINET®**
- OPC UA and MQTT interface under preparation
- Integral web server
- Separate power supply

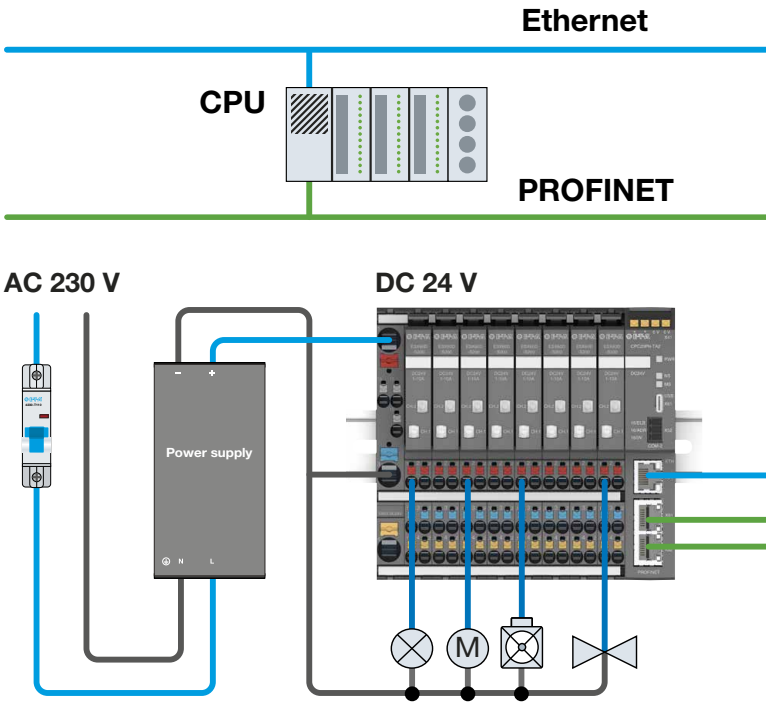
**Typical applications:**

- Factory automation
- Automation
- Car production
- Chemical industry
- Pharmaceuticals and foodstuffs
- Steel industry

**Benefits:**

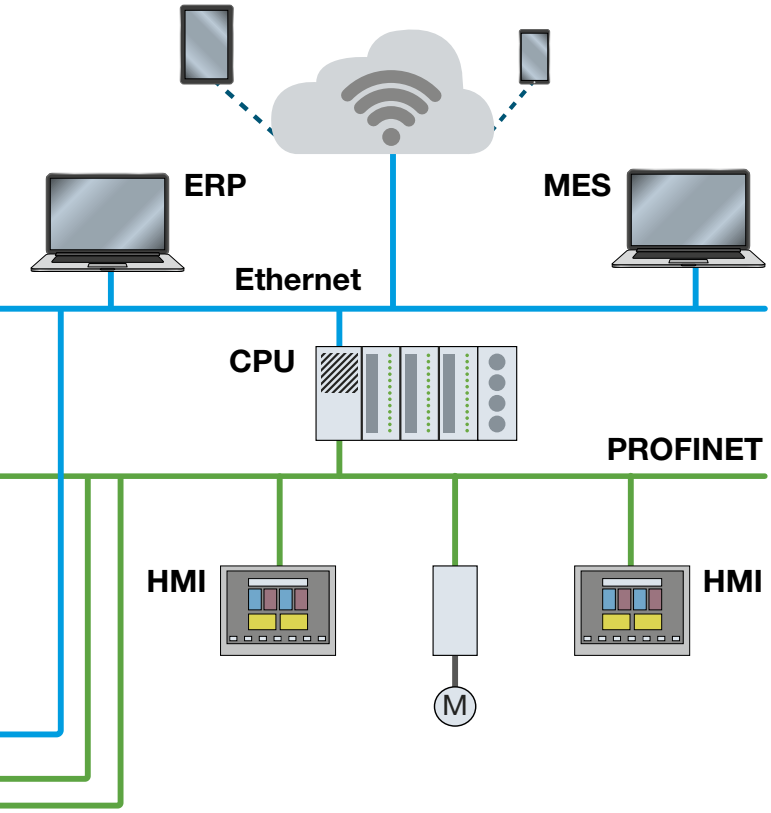
- Enhances system availability through comprehensive diagnostic functions
- Improves protection against voltage dips through selective protection of loads
- Increases the flexibility of system planning through a modular terminal block system

For information on ***ControlPlex*® DINrail CPC20 *ControlPlex*® system** please visit: **www.e-t-a.de/e754**

The intelligent CPC20 ***ControlPlex***® system protects your DC 24 V power distribution against overload and short circuit. The basis is the modular terminal block system module 18plus. The ESX60D electronic circuit protector completes the system. It continuously records the load current and the load voltage of the system. The CPC20 bus controller combines all measuring values and forwards them to the connected control systems via PROFINET. The system operator can continuously monitor his power distribution system and detect changes or aberrations at an early stage.

The ***ControlPlex***® system prevents undesired downtimes, improves system transparency and stabilises the production process in terms of condition monitoring. Quality of the produced goods and system availability are significantly improved.


The CPC20 power distribution system allows intelligent and transparent protection of the DC 24 V power distribution. The interfaces for PROFINET and MQTT make status information and measuring values of the circuit protectors available on all levels of the control structure.

# *ControlPlex*® DINrail CPC20

## Module 18plus

## Description

The intelligent power distribution system **18plus-*ControlPlex***® is a compact wiring solution for all load and signal lines of the DC 24 V control voltage. It holds a complete mounting and power distribution system for DIN rail mounting which has, together with the busbars, a fully-featured 80 A power distribution of the DC 24 V control voltage without additionally required terminals and connection lines.

In connection with the CPC20 controller it offers the option to accommodate up to sixteen double-channel ESX60D electronic circuit protectors and to enable communication.

## ESX60D circuit protector


## Description

The ESX60D is a double channel smart electronic circuit protector, forming an intelligent power distribution system with the CPC20 bus controller and power distribution module **18plus-*ControlPlex***®. ESX60D transmits status and measuring values to the superordinate control unit. It is fit for flexible use as it can be parameterised and has a small width of only 12.5 mm.

- Space-saving design
- Continuous data collection
- Automatic parameterisation
- Reduced inventory

## CPC20 bus controller


## Description

The CPC20 bus controller is the central communication sub-assembly of the ***ControlPlex***®-CPC20 intelligent power distribution system. The CPC20 allows communication with up to 32 double channel ESX60D electronic circuit protectors. It enables read-out of their status, their corresponding operation data such as the present load current and the load voltage and it enables control and parameterising of the devices. With its interfaces, the CPC20 offers the perfect connection to the superordinate systems.

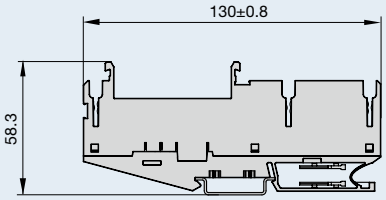
- Separate power supply
- USB service interface, **ELBus**® Extended, OPC UA and MQTT
- Integral web server
- Field bus connection

For information on ***ControlPlex®*** **DINrail CPC20** please visit: **www.e-t-a.de/e754**

## Technical data

| | |
|---|---|
| **Mounting method** | DIN rail |
| **Max. rated voltage** | DC +24 V |
| **Number of ways** | 2 x 16 modules (2 x 32 channels) |
| **Supply max. current rating** | 80 A |
| **Max. current rating of loads** | 20 A |
| **Ambient temperature** | -25 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e754 |

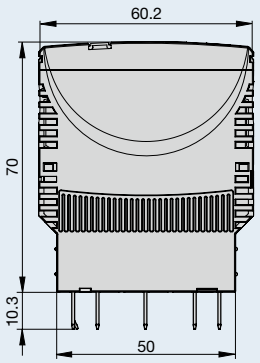
## Dimensions




## Technical data

| | |
|---|---|
| **Mounting method** | **Module 18plus-*ControlPlex®*** |
| **Voltage ratings** | DC 24 V |
| **Rated current** | adjustable 1 A ... 10 A |
| **No. of channels per unit** | 2 |
| **Current limitation** | typically 1.4 - 1.8 x $I_N$ |
| **Ambient temperature** | -25 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e754 |

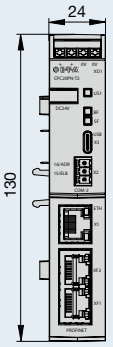
## Dimensions




## Technical data

| | |
|---|---|
| **Mounting method** | symmetrical rail |
| **Voltage ratings** | DC 24 V |
| **Rated current** | typically= 160 mA (with 1 x Ethernet and 2 x PROFINET) |
| **Ambient temperature** | 0 °C ... +60 °C |
| **For more information please visit** | www.e-t-a.de/e754 |

## Dimensions



# *ControlPlex*® Rack

## Reliable – precise – smart

***ControlPlex*® Rack** is the intelligent complete system for power distribution and overcurrent protection, combined with smart control and surveillance technology. The system was designed particularly for the selective protection of minus or plus supplied systems.

**Successful applications in many markets**

- Power engineering: communications systems, for example for control and supply of high voltage networks
- Datacom: control and supply of servers
- Telecommunications: control and supply of system cabinets

**Engineering**

Major applications are systems of telecommuncation technology, both in the negative (DC -48 V or DC -60 V) and in the positive voltage range (DC 24 V, 48 V, 60 V) at different current ratings. The ***ControlPlex*® Rack** series does not only offer compact power distribution including safety, clear layout, space savings, redundancy and selectivity, but it also connects the communication capabilities to the customer's control system.

**Components of the system**

- PDB-CP – a standardised ***Power-D-Box*®** with bus pcb (for plug-in type circuit protector and control interface sub-assembly), modular extension of the number of channels as well as clearly laid-out cable management.
- ESX300-S – bus-capable electronic circuit protector, hot-swappable, selective precise load disconnection and extended local failure display per LED.
- RCI10 – Remote Control Interface for early detection of failures through continuous recording of measuring data. It provides enhanced system availability and reduces maintenance time on site, e.g. through manual or web-based remote control and monitoring.
- RSI10 – Remote Signalling Interface for provision of potential-free contacts.
- EAI – External Alarm Interface can additionally include external encoder signals into the alarm protocol.

Do you have additional requirements? Our experts shall be pleased to design a tailor-made solution for you.

For information on ***ControlPlex*® Rack** please visit: **www.e-t-a.de/e850**

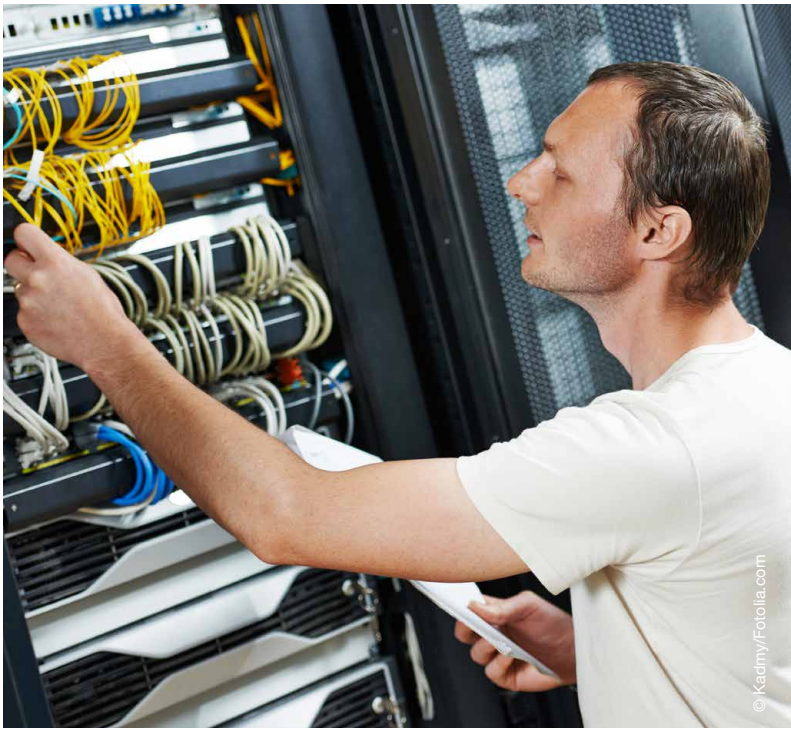

**power distribution**

**integration of sensors**

**overcurrent protection**
**active current limitation**

**remote control**








**RSI10** **EAI300** **RCI10** **ESX300-S**

**Our performance profile – your benefits**

- Reduced fire hazard through precise, selective failure disconnection
- System stability in the event of a short circuit through avoidance of voltage dips
- Flexibility through hot-swappable components
- Reduced start-up times through plug-in type (individual) load terminals and failure reduction through extended display functions
- Reduced maintenance time through measuring data recording and automation via an extendable control interface (optional)

Examples for customised configuration of

The ***ControlPlex®*** **Rack**, among others provided by a multitude of supply and load connection options.

**remote configuration**

**remote monitoring**

# *ControlPlex*® Rack

## *Power-D-Box*® CP

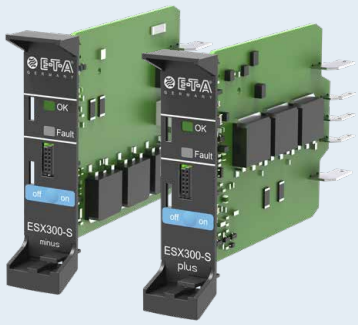
### Description

The 2U ***Power-D-Box***® CP accommodates the plug-in type ESX300-S electronic circuit protectors in various ratings. Signalling and conduits feature are fitted in a compact metal enclosure, protected against brush contact so that live parts cannot be touched. Connection is via screw terminals or high-current SUB-D connectors. Available options include back-up fuses, single or redundant circuits, custom designed marking etc.

**Typical applications:**

- Power engineering
- Telecommunications
- Datacom

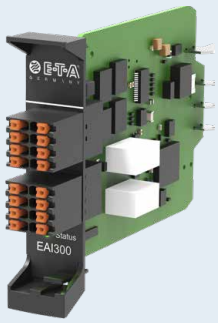
## ESX300-S *minus*/ESX300-S *plus*




### Description

The ESX300-S minus electronic circuit protector was designed for systems, in which the negative or ESX300-S plus is protected. Overcurrent and short circuit protection are realised by means of electronic current limitation and disconnection and reliably prevent the destruction of electronic sub-assemblies and load lines. In addition, the electronic current limitation prevents in the event of a short circuit that high currents will flow, causing an undesired voltage dip.

## EAI300




### Description

In combination with the RCI10, the **EAI300** External Alarm Interface allows recording of external sensor data and external alarm generators as well as their alerting on the management system. It includes additional monitoring and display of door contacts, fire alarm boxes or temperature sensors in the engineering room. It means best possible system transparency and fast intervention in the event of alarm. Thanks to programmable logical links, operating conditions of the ESX300-S can be connected with external encoder signals, allowing automatic switching operations.

## RCI10/RSI10


### Description

The **RCI10** Remote Control Interface allows remote control and monitoring of the system and its connected loads, reduces maintenance costs and provides plants with unrivalled transparency. It integrates the ***ControlPlex***® rack system into the network surroundings and thus into the centralised corporate management system. It can query and buffer individual measuring data, status conditions and error messages of the ESX300-S and forward them to the superordinate control unit.

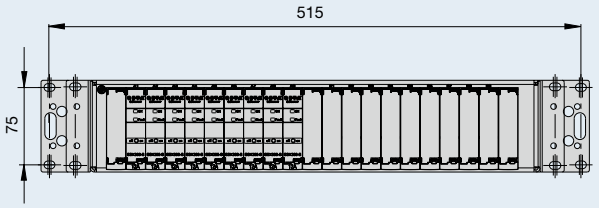
The **RSI10** Remote Signalling Interface ensures reliable and early detection of critical system conditions by means of potential-free contact.

For information on ***ControlPlex®*** please visit: **www.e-t-a.de/e850**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC -48 V, DC -60 V<br>DC +24 V, DC +48 V, DC +60 V |
| **Rated current** | total max. 200 A<br>single load max. 30 A |
| **Number of load channels** | 1 x 19<br>2 x 9 |
| **Cable cross sections** | supply max. 50 $mm^2$<br>load max. 10 $mm^2$ |
| **For more information please visit** | www.e-t-a.de/e850 |

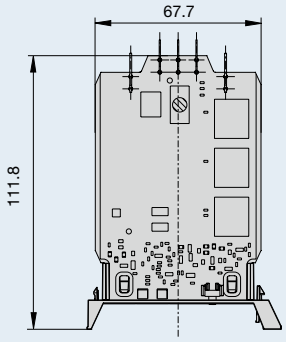
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | ***Minus:*** DC -48 V, DC -60 V<br>***Plus*** DC +24 V, DC +48 V,<br>DC +60 V |
| **Rated current** | max. 24 A |
| **Trip current** | typically 1.2 x $I_N$ |
| **Ambient temperature** | -20 °C ... +60 °C) |
| **For more information please visit** | www.e-t-a.de/e850 |

## Dimensions

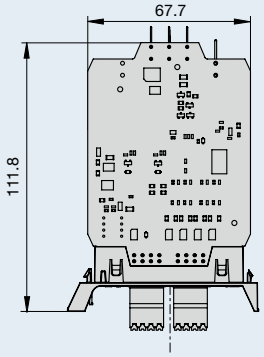



**Example:**
**ESX300-S *minus***

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC +20 V... +75 V<br>typically 40 mA at DC 48 V |
| **Digital inputs** | 8 x (physical isolation) |
| **Analog inputs** | 1 x (physical isolation) |
| **Digital outputs (relay outputs)** | 2 x (potential-free break contact) |
| **For more information please visit** | www.e-t-a.de/e850 |

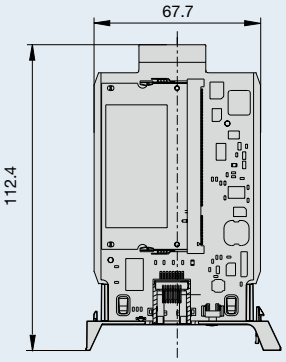
## Dimensions




## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 20 V ... DC 75 V |
| **Current consumption** | **RCI10:** typically 80 mA |
| **Protocol support** | SNMP, SSH, HTTP/HTTPS, NTP, DHCP **(RCI10)** |
| **Ambient temperature** | -20 ... +60 °C) |
| **For more information please visit** | www.e-t-a.de/e850 |

## Dimensions




**Example: RCI10**

# *PowerPlex*® Systems

## Efficient engineering – convenient connection and automation via CAN bus system

A general tendency towards automation technology has spread over all industrial areas. It also opens up a wealth of new possibilities for on-board electrical systems on boats, mobile homes and special vehicles, offering intelligent networks. ***PowerPlex***® is E-T-A's answer to this development. The CAN-bus-based freely programmable control system handles intelligent power distribution and monitoring jobs which could not be solved by means of conventional wiring.

**Modular design – individual style**

Our modular system design makes your engineering work even more flexible. Various DC and AC control modules as well as different operating devices make up the comprehensive ***PowerPlex***® product range for realisation of in on-board electrical systems. The system scope is a direct reuslt of the vehicle specification and your individual control and automation requirements. They will be realised and programmed by means of the configuration. The communication of the ***PowerPlex***® products is via an SAE J1939 compliant CAN bus, which reliably transmits all relevant data even in critical situations. Our goal is smooth integration of all ***PowerPlex***® products. A ***PowerPlex***® system solution can be quickly installed and put into operation, and it can flexibly be extended. Any customer wishes uttered later can still be implemented.

**User convenience – combined with reliability**

Smart on-board engineering not only helps with operation. It also helps to save energy and enhances safety on board by especially adjusted safety management functions. ***PowerPlex***® monitors, informs and alerts the user with regard to malfunctions of the installed on-board electrical system. This ensures a smooth operation and the continuing availability of relevant components. In addition, our remote maintenance feature allows the E-T-A ***PowerPlex***® to be globally configured and adjusted by our specialists. This helps to minimise standstills and maintenance times and the resulting costs.

**Visualisation and operator convenience**

A clear visual display of operating conditions and job execution provides convenient and reliable operation. We offer various ***PowerPlex***®-specific operating concepts – from keypads over tailor-made user interfaces for Touch Displays up to mobile end devices such smart phones or tablets. Instead of getting out of bed to turn the air condition down, you simply pick up your smart phone.

For information on ***PowerPlex***® please visit: **www.e-t-a.de/e900**

**Application examples Marine**

- Tank level monitoring of fuel, fresh water and waste water
- Bilge pump control and monitoring
- Air conditioning control
- On-board/off-shore scenarios

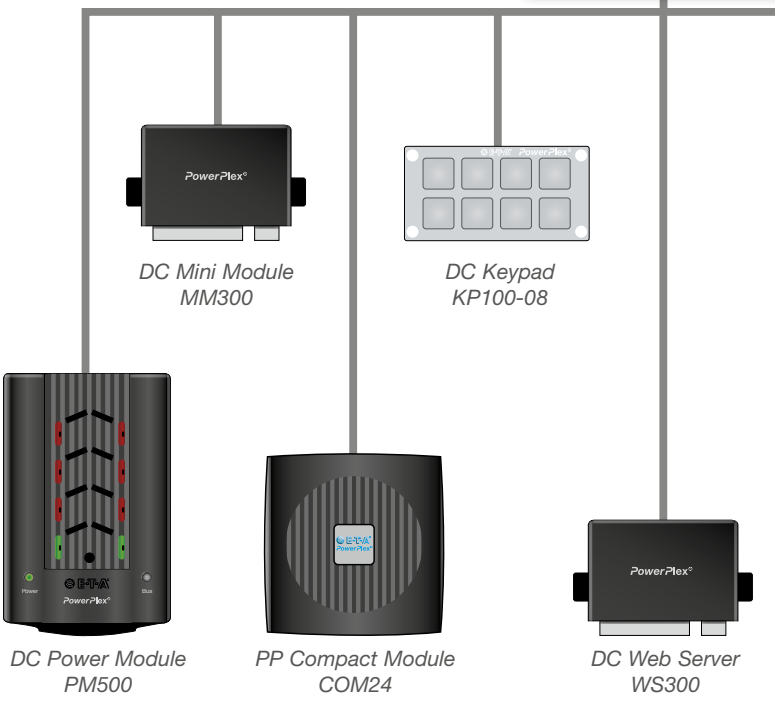
**Application examples Mobile homes/caravans**

- Tank level monitoring of fresh water and waste water
- Dimming LED lights
- Heater control
- Control of step treads or cabover beds

**Application examples Blue Light**

- Air conditioning control
- Side lift control
- Control and function monitoring of e.g. front flashers or marker lights
- Control of analogue or digital wireless equipment

**Individual user interfaces:**
Boat, bus/mobile home, ambulance


*DC Mini Module MM300*

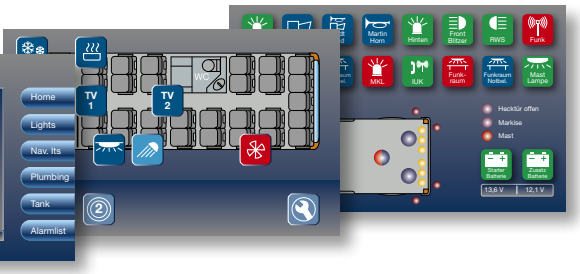
*DC Keypad KP100-08*

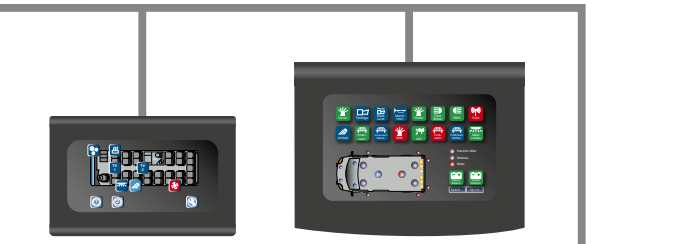
*DC Power Module PM500*

*PP Compact Module COM24*

*DC Web Server WS300*



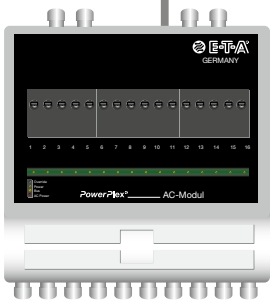



*DC Touch Panel 4.3"*
*TP043*



*DC Touch Panel 7.0"*
*TP070*




*AC Power Module*


Simply connecting everyting. Lights, heating, air con, pumps and more. Convenient and user-friendly control by smart phone or tablet.

Growing digitisation makes smart on-board electrical systems in watercraft, caravans and special vehicles a topical subject in global competition. ***PowerPlex®*** reliably and precisely connects, regulates, controls and monitors all kinds of electrical loads, switches and sensors via CAN. It controls status indications, operating conditions and execution of commands. Various alerting functions inform the user about undesired system conditions of the electrical system. Most of them can be remedied simply at the touch of a button and can also be reviewed by looking at the alarm history. Save time and costs during system planning and wiring. Come and see for yourself – the potentials held by ***PowerPlex®*** will convince you.

# *PowerPlex*® Systems

## *PowerPlex*® HMI Solutions

## Description

The ***PowerPlex***® HMI devices allow convenient observation and intuitive operation. Visualise status, alarm or error messages. Select your favourite from various keypads, touch displays for your ***PowerPlex***® application. Do you have special visualisation jobs? The ***PowerPlex***® Touch PC Software helps you to create individual user interfaces and integrate any Windows-based touch PC into the system.

**Typical applications:**

- Leisure boats
- Workboats
- Special vehicles
- Mobile homes and caravans

## *PowerPlex*® I/O Power Modules

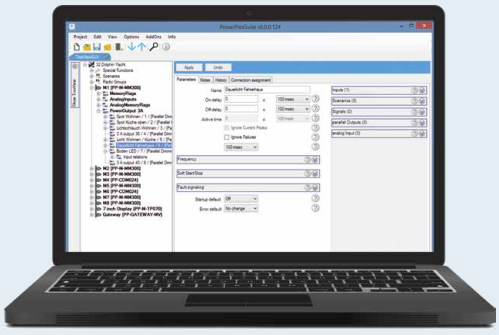
## Description

The ***PowerPlex***® modules are intelligent controlunits for DC and AC applications which can be used alone or in combination. Depending on the number of the required inputs and outputs and the complexity of the control jobs, you can select the system components you need. Programming will be done following your individual automation requirements. Within a ***PowerPlex***® system, replacement parts will automatically be identified and configured via a neighbouring module.

**Typical applications:**

- Leisure boats
- Mobile homes and caravans
- Workboats
- Special vehicles

## *PowerPlex*® Suite



## Description

The ***PowerPlex***® configuration software is intuitional and easy to understand. No programming expertise is required. The user can define, save and revise individual configurations regarding power distribution, control and monitoring.

The »intelligence« contained in the configuration will be transmitted to the ***PowerPlex***® components via CAN bus. Your electrical installation will then be completed fast and professionally. All existing configurations from other projects can be uploaded at any time and then be revised and saved.

## *PowerPlex*® Service & Support


## Description

Our specialists will support you with any services you require regarding product, system or application. We assist you with selecting suitable ***PowerPlex***® components and advise you concerning technical queries during system planning, installation and start-up. Many things can easily and quickly be clarified on the phone or via remote maintenance without having to be on site.

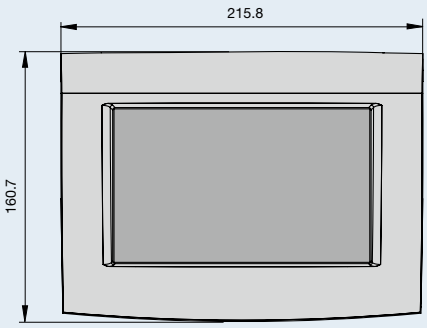
Upon request we can provide you with a complete system configuration and tailor-made user interfaces. We shall be pleased to give you a detailed and comprehensive product training on our ***PowerPlex***® range.

For information on ***PowerPlex***® please visit: **www.e-t-a.de/e900**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V<br>DC 24 V<br>AC 230 V |
| **Approvals** | product-specific:<br>KBA |
| **For more information please visit** | www.e-t-a.de/e900 |

## Dimensions

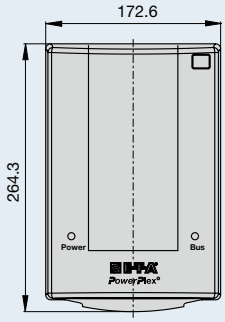



**Example:**
**Touch Panel 7.0"**
**PP-M-TP070**

## Technical data

| | |
|---|---|
| **Voltage ratings** | DC 12 V<br>DC 24 V<br>AC 120 V<br>AC 230 V |
| **Approvals** | product-specific:<br>GL, LR, KBA |
| **For more information please visit** | www.e-t-a.de/e900 |

## Dimensions




**Example:**
**Power Module**
**PM500**

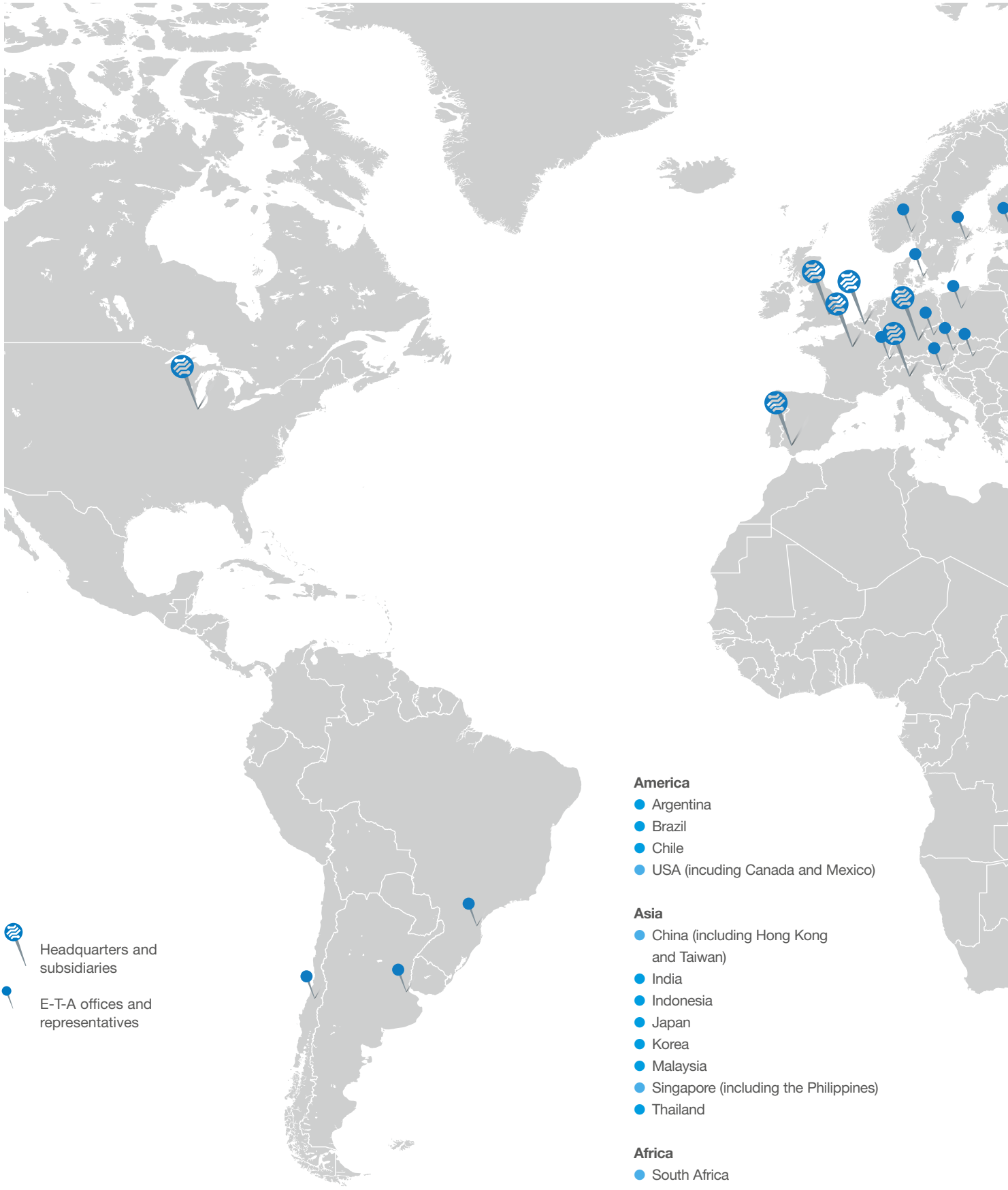
## Technical data

| | |
|---|---|
| **For more information please visit** | www.e-t-a.de/e900 |

## Technical data

| | |
|---|---|
| **For more information please visit** | www.e-t-a.de/e900 |

# 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 (including 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 the Middle East)
- Hungary
- United Kingdom (including Ireland)

# Notes

Do you wish to contact us?
We are looking forward to receiving your queries: www.e-t-a.de/contact

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