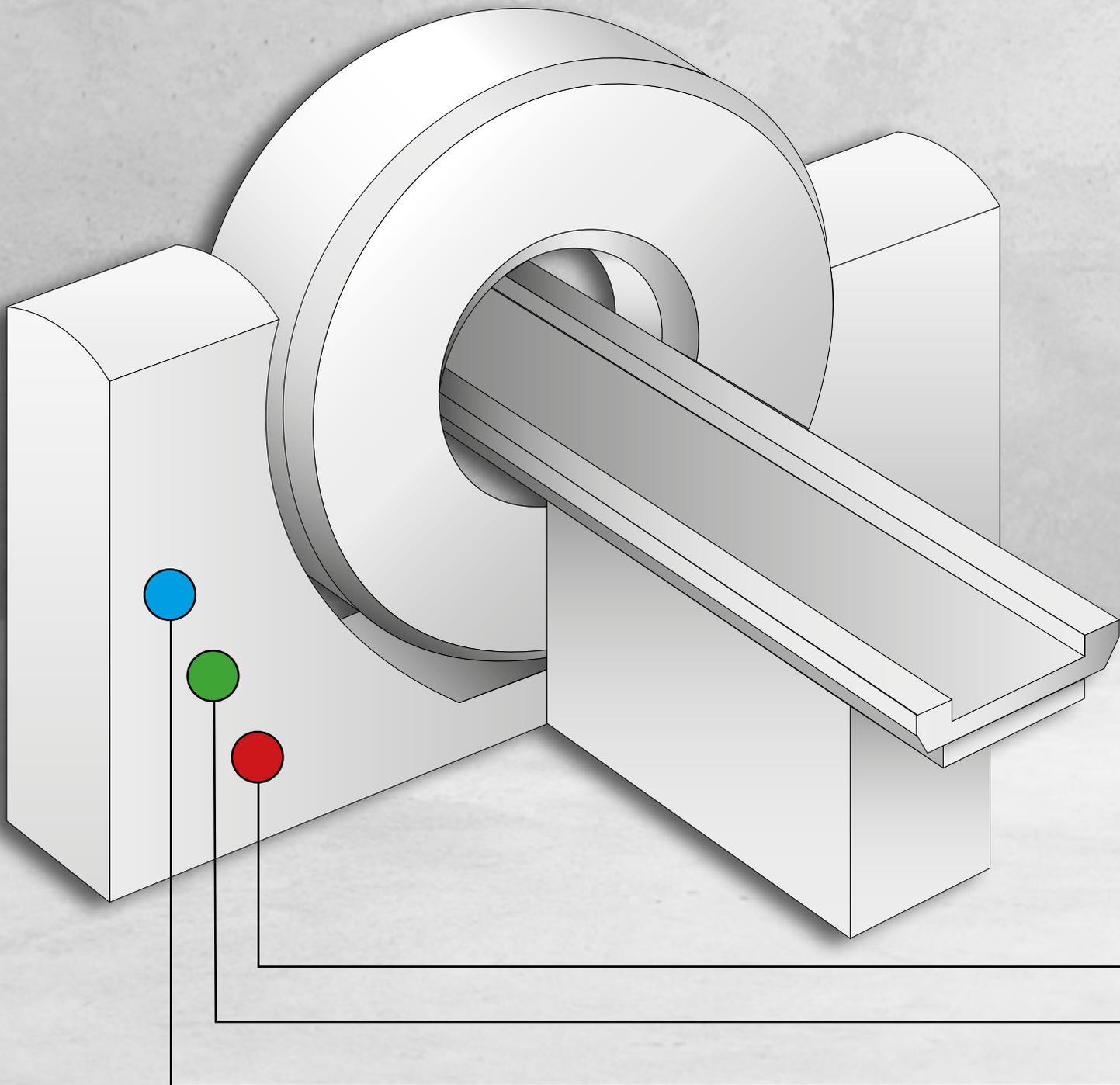


Applications of professional overcurrent protection in equipment



Professional protection of equipment



Collective protection on the input side

Mobile and semi-stationary equipment generally have a plug (mains plug or inlet plug) to connect to the AC network. In the event of a failure, circuit breakers installed on the input side, immediately after the plug, will disconnect the entire piece of equipment from the mains power supply.

Selective individual protection

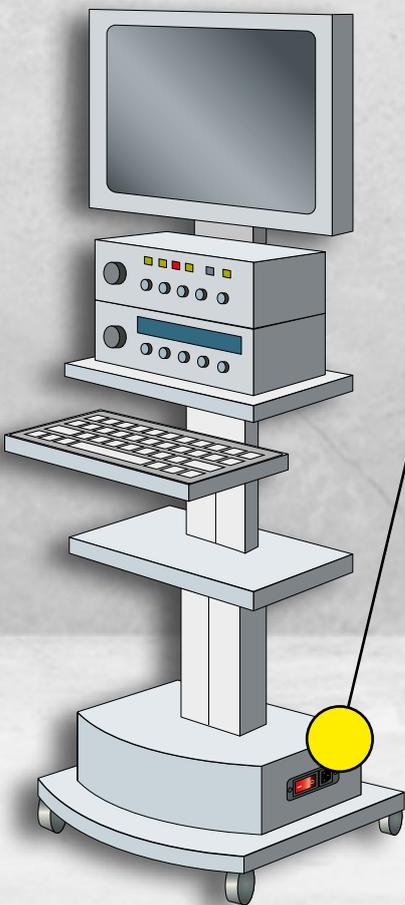
In equipment with several loads, it is often necessary to selectively protect these loads in addition to the collective protection on the input side. It is the only way to specify professional overload protection that is appropriately rated for loads like electric motors and transformers.

Protection of printed circuit boards

Printed circuit boards in stationary and semi-stationary equipment often requires additional fast-acting overcurrent protection because of their very sensitive semi-conductor components.

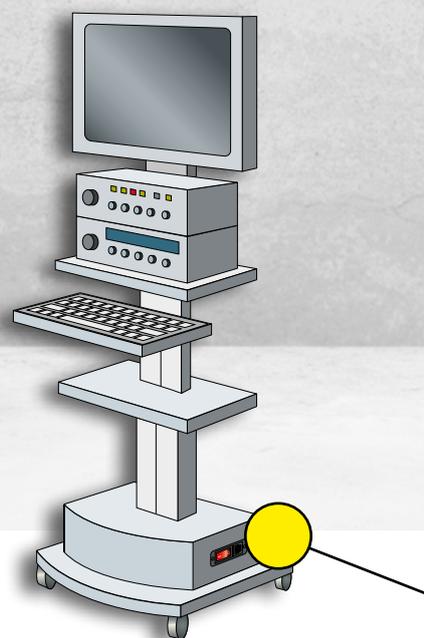
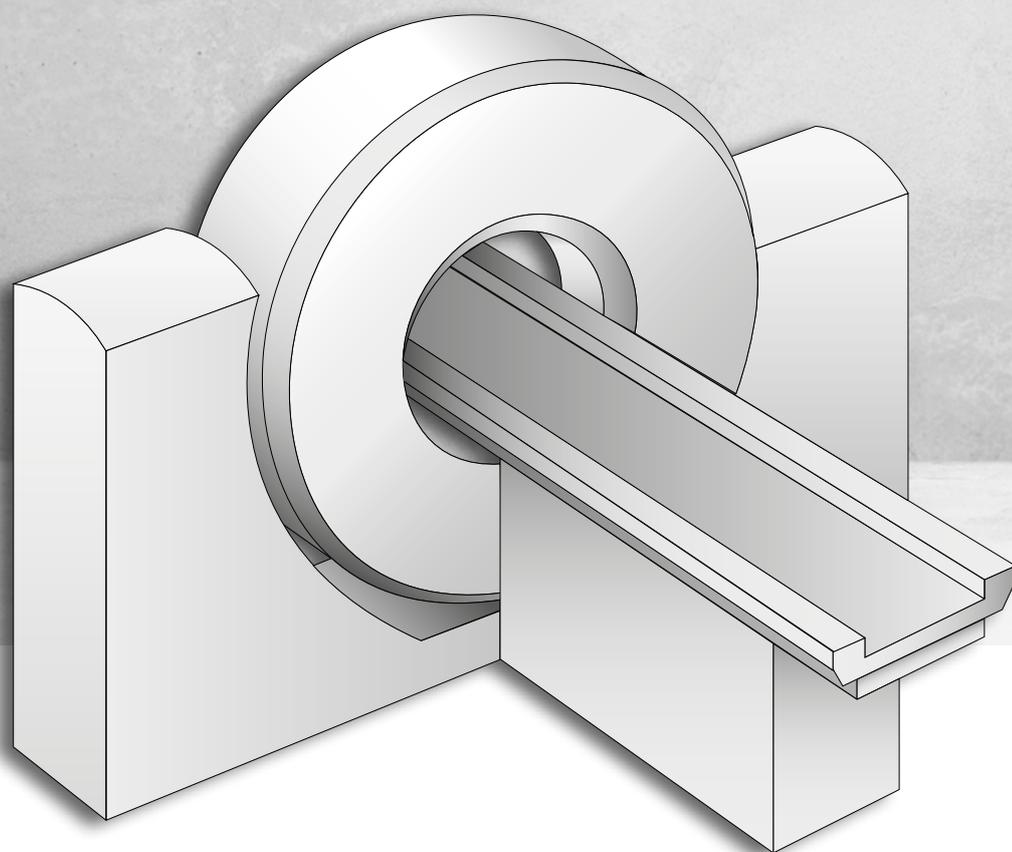
Selective protection of DC 24 V loads

DC 24 V loads in stationary equipment today are normally supplied by primary pulsed switch mode power supplies. E-T-A circuit breakers provide selective overcurrent protection.



Collective protection on the input side

- Time-saving
- Space-saving
- Cost-saving



Typical products for overcurrent protection on the input side



Resettable circuit breaker

2-5700 single pole thermal reset circuit breaker



Circuit breaker/ switch combination

3130 3-pole thermal circuit breaker with ON/OFF function



Appliance inlet modules

X3120-A E-T-A appliance inlet module with double pole thermal-magnetic 3120-N circuit breaker and C14 inlet filter

Collective protection on the input side

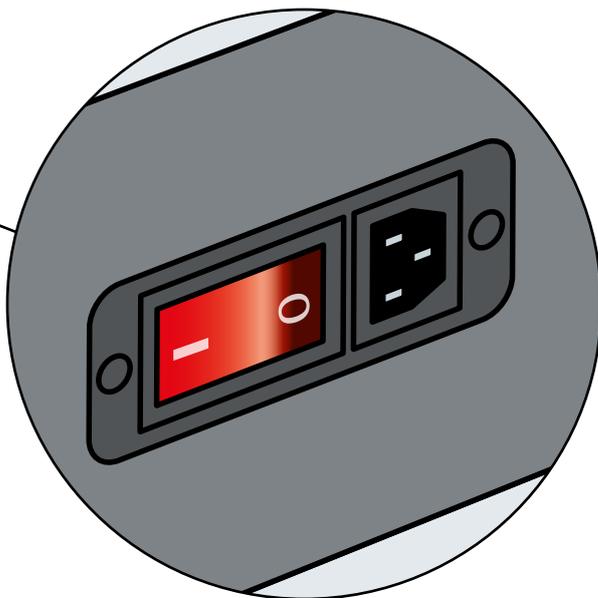
Mobile and semi-stationary equipment generally have a plug (mains plug or inlet plug) to connect to the AC network. In the event of a failure, circuit breakers installed on the input side, immediately after the plug, will disconnect the entire piece of equipment from the mains power supply. This is an advantage in cases where continuing partial operation is unnecessary or even hazardous. The IEC EN 60601 standard for medical equipment explicitly requests a collective protection on the input side for safety reasons.

E-T-A plus factors

- E-T-A circuit breakers increase equipment uptime. After a trip, they can be reset easily, safely and above all quickly. The time-consuming and often annoying change of fuses is eliminated.
- Many of E-T-A's circuit breakers simultaneously serve as the ON/OFF switches for equipment. This significantly reduces the number of installed components. E-T-A appliance

inlet modules combine up to 4 functions in a single component: an IEC inlet plug, an ON/OFF switch, resettable overcurrent protection and a line filter. This makes it significantly easier to design equipment.

- Thanks to professional sealing solutions, E-T-A's circuit breakers can even be used under extreme environmental conditions.
- E-T-A's circuit breakers clearly indicate an overcurrent trip: With resettable circuit breakers, the reset button pops out and with circuit breaker/switch combinations, the actuator moves to the OFF position and the illumination is off. This is quite different with fuses: If they have really blown it can often only be verified at a great expense of time.
- E-T-A's circuit breakers are also available in multipole versions. This saves money and, more importantly, avoids electricity accidents. Only multipole circuit breakers reliably disconnect the live phase conductor.



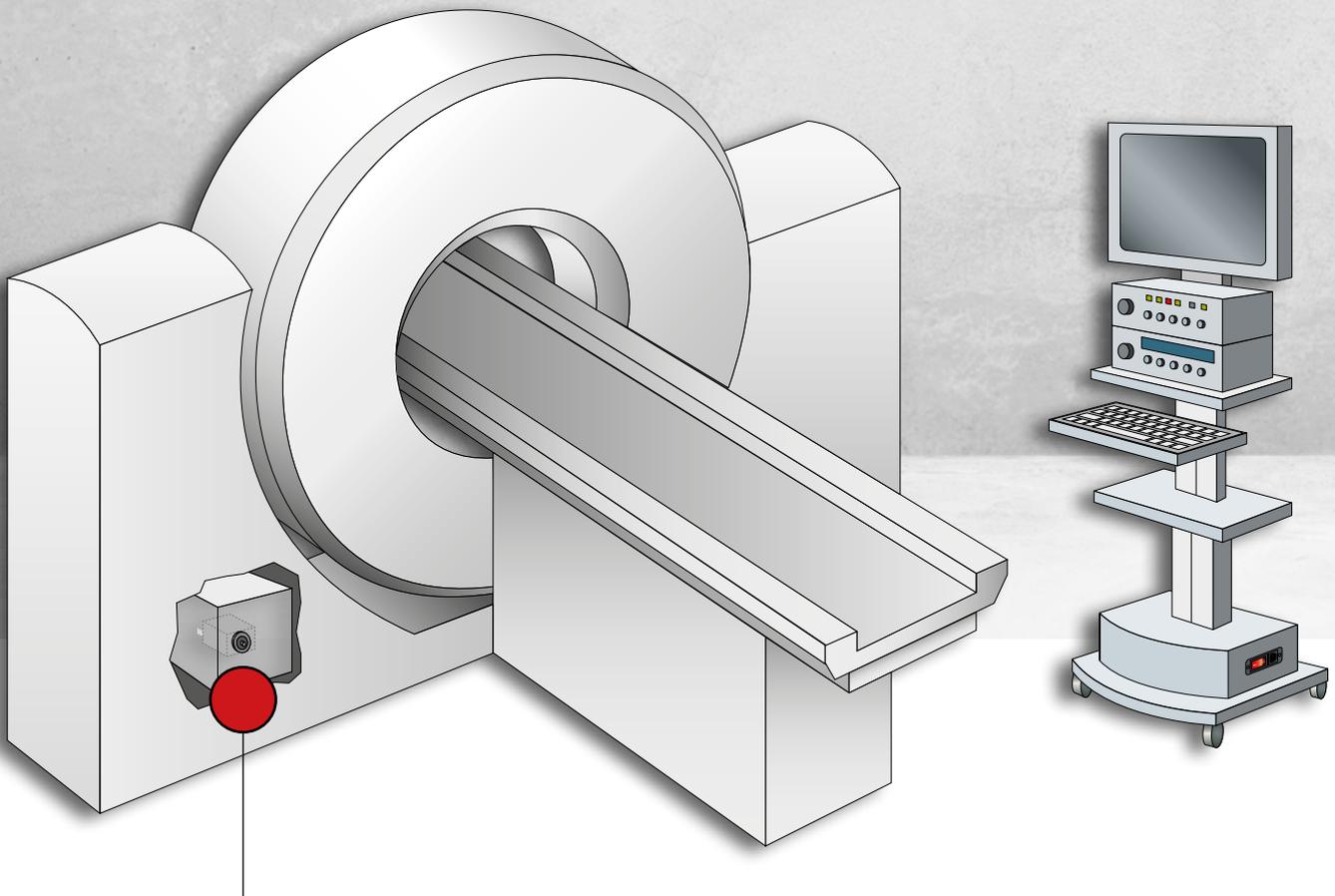
Appliance inlet modules

E-T-A's X3120-A appliance inlet module with 3120-N 2-pole thermal-magnetic circuit breaker and C14 filter

The first choice for input-side collective protection:
E-T-A circuit breakers

Selective individual protection

- Reliable
- Space-saving
- Selective



Typical products for selective individual protection



106 single pole thermal resettable circuit breaker in miniaturised design



Single pole thermal-magnetic resettable circuit breaker with threadneck-mounting



Double pole hydraulic-magnetic circuit breaker with integral auxiliary contacts

Selective individual protection

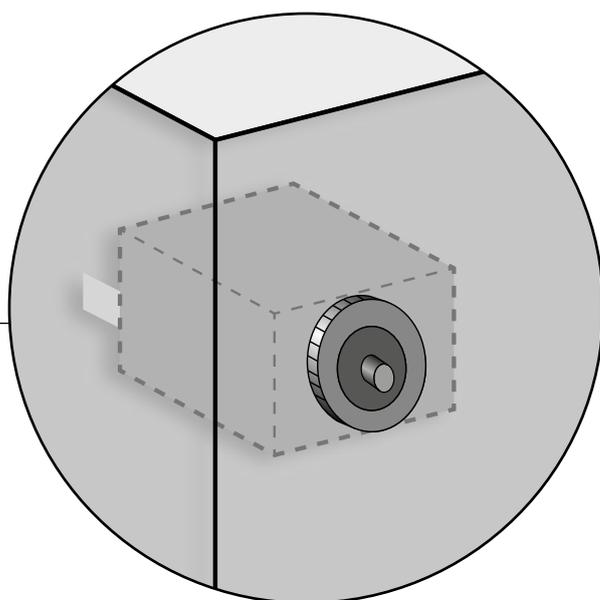
In equipment with multiple loads, it is often necessary to selectively protect these loads in addition to the collective protection on the input side. It is the only way to specify a professional overload protection that is appropriately rated for loads like electric motors and transformers. In the special case that a device or a machine has only one electrical load - such as a grain mill or a paper shredder - the central input circuit breaker can be adapted to the load.

E-T-A plus factors

- E-T-A's circuit breakers increase equipment availability. After a trip, they can be reset easily, safely and above all quickly. The time-consuming and often annoying change of fuses is eliminated.
- E-T-A's circuit breakers clearly indicate an overcurrent trip: With resettable bimetal-operated circuit breakers, the reset button pops out clearly visibly.

Many circuit breakers have a coloured indicator ring around the push button to further support a quick visual failure indication. This is quite different with fuses: If they have really blown can often only be verified at a great expense of time.

- E-T-A's circuit breakers feature an extremely compact design and require only very little space. **E-T-A's 104/105/106 circuit breakers** and **the 1140 series** can easily fit in a matchbox.
- E-T-A's circuit breakers are available in finely tuned current ratings with different trip characteristics (thermal and thermal-magnetic, hydraulic-magnetic, purely magnetic and electronic). All kinds of electrical loads can optimally and selectively be protected.
- Many E-T-A circuit breakers are available with integral auxiliary contacts. Overcurrent trips can visually and acoustically be indicated and transmitted to a control unit.



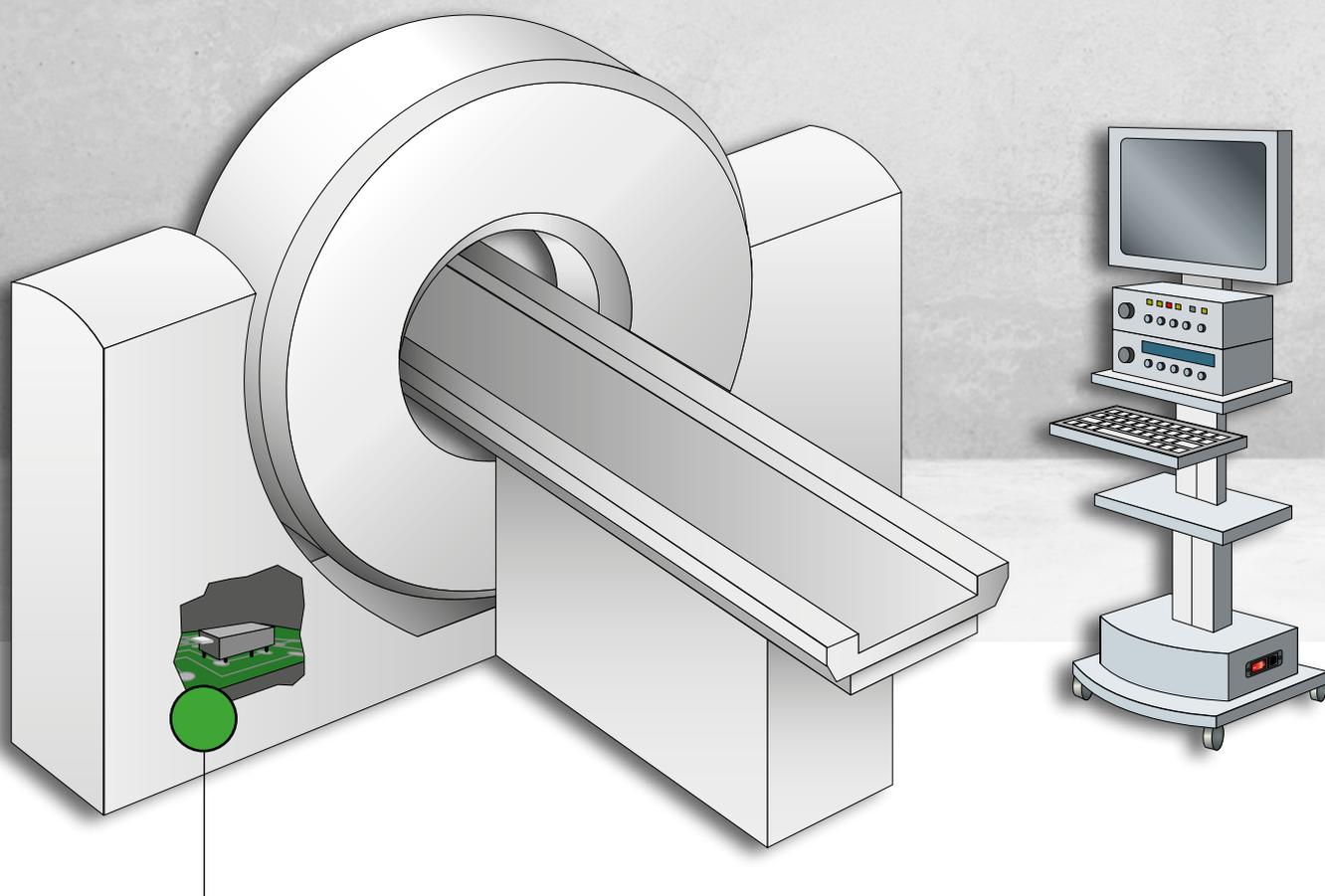
Resettable circuit breakers

106 single pole thermal resettable circuit breaker in miniaturised design

Increase machine uptime:
E-T-A circuit breakers for selective individual protection

Protection of printed circuit boards

- Cost-saving
- Space-saving
- Easy to install



Typical products for protecting printed circuit boards



104 thermal circuit breaker for pcb mounting



1410-L2 thermal E-T-A circuit breaker with very fast trip characteristic for pcb mounting



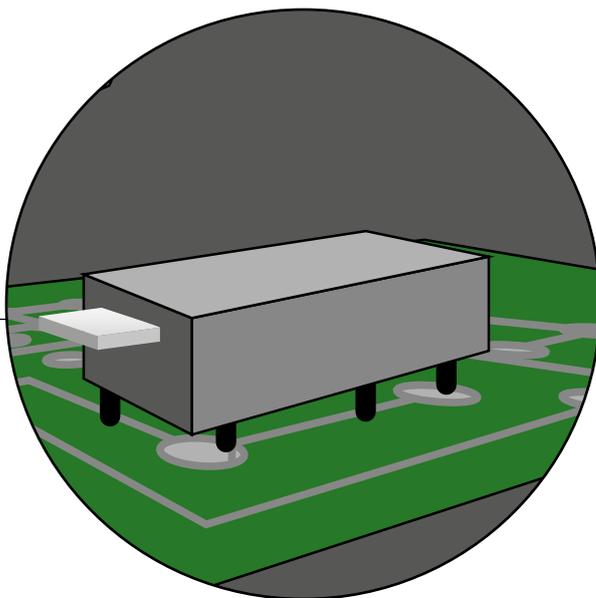
808 magnetic circuit breaker for pcb mounting

Protecting printed circuit boards

Printed circuit boards in stationary and semi-stationary equipment often require additional fast-acting overcurrent protection because of their very sensitive semi-conductor components. Fuses can basically do the same thing. However, they have a clear disadvantage: in the event of a failure, they “blow” and then have to be replaced. This costs a lot of expensive service time. And much worse: If inadvertently an incorrectly rated fuse is installed, there might be no protection at all afterwards. Resettable circuit breakers eliminate this risk and can immediately be reset after tripping. Many E-T-A circuit breakers offer soldering pins as a standard option and can be directly soldered onto the printed circuit board.

E-T-A plus factors

- E-T-A’s circuit breakers increase equipment uptime. After a trip, they can be reset easily, safely and above all quickly. A time-consuming and often hazardous change of fuses is eliminated.
- E-T-A circuit breakers for pcb mounting feature an extremely compact design and require very little space on the pcb. For instance, E-T-A’s **1410-L2** does not require more space than a glass tube fuse.
- In spite of their extremely miniaturised design, E-T-A’s circuit breakers for pcb mounting have integral auxiliary contacts and auxiliary circuits for signalling the OFF condition.
- E-T-A’s circuit breakers for pcb mounting physically interrupt the circuit. This is a clear advantage, particularly compared to autoreset polymer PTCs that only limit the current flow.
- E-T-A’s **1410** thermal circuit breaker (hot wire principle) and E-T-A’s **808** both feature a very fast trip curve. They are ideal for providing overcurrent protection on printed circuit boards.



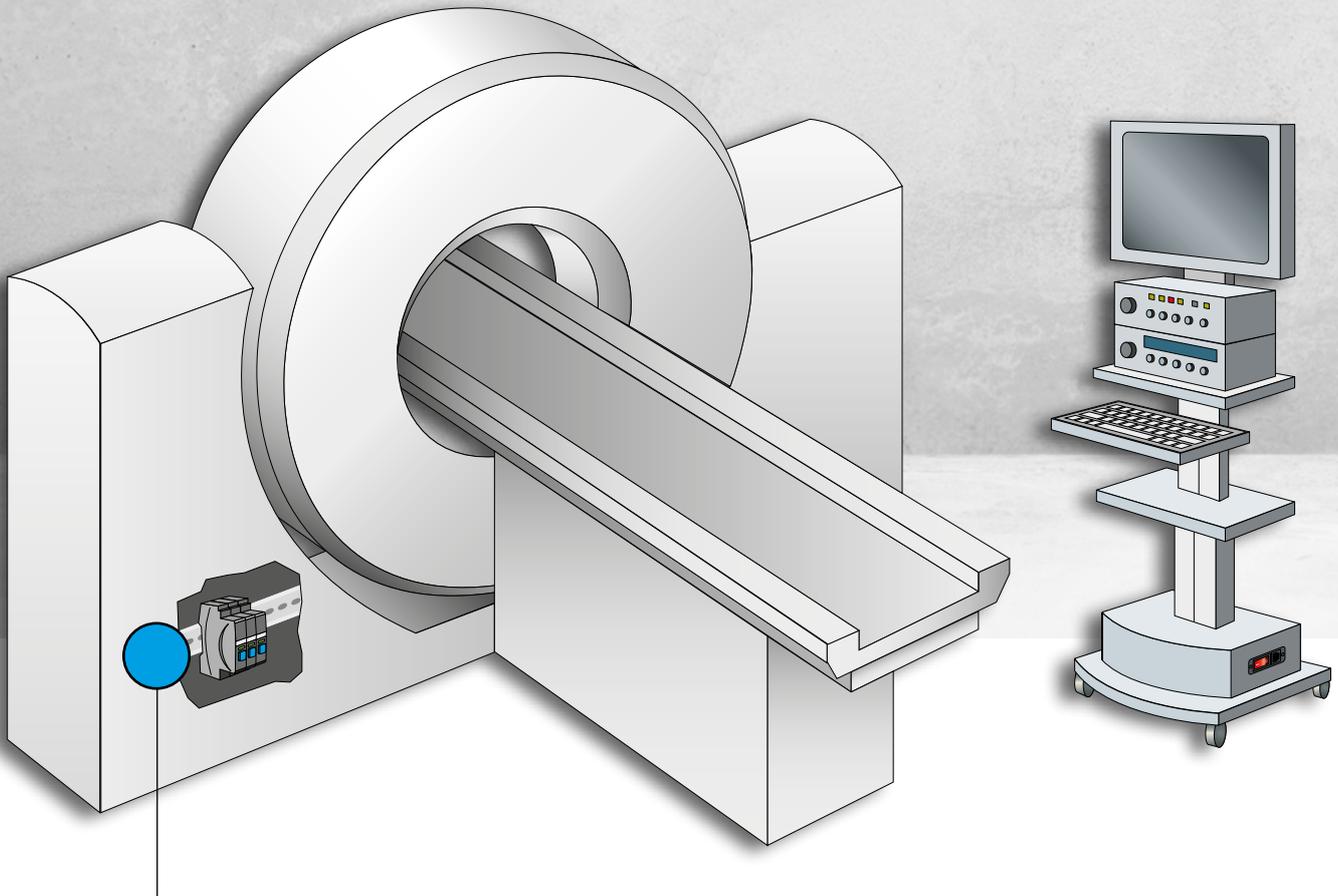
Resettable circuit breakers

1410-L2 single pole thermal resettable circuit breaker in miniaturised design

Immediately back to service:
E-T-A resettable circuit breakers

Selective protection of DC 24 V loads

- Modular
- Flexible
- Reliable



Typical products for selectively protecting DC 24 V loads



2216 thermal-magnetic circuit breaker with socket system **80Plus**



ESX-T electronic circuit protector for rail mounting



ESS31-T electronic circuit breaker providing physical isolation

Selective protection of DC 24 V loads

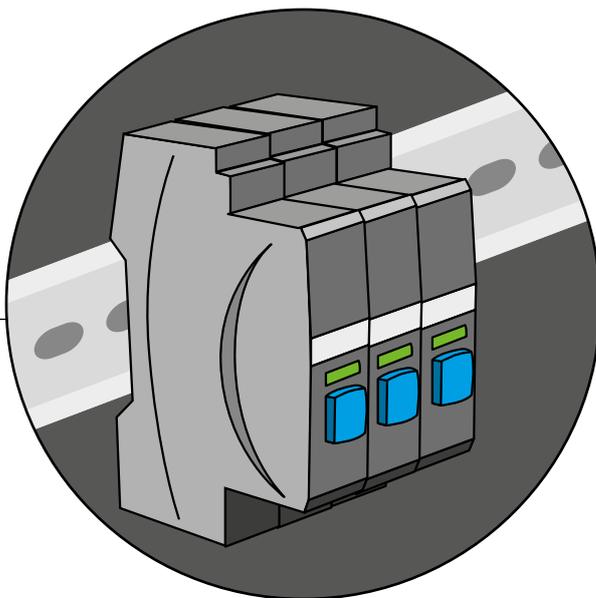
DC 24 V loads in stationary equipment today are typically supplied by primary pulsed switch mode power supplies. E-T-A's circuit breakers provide selective overcurrent protection. They ensure that only the faulty path is disconnected in the event of a failure and all other loads continue to be powered by the switch mode power supply. Downtimes are reduced to a minimum.

E-T-A plus factors

- E-T-A's circuit breakers and circuit protectors feature an ultra-slim design and require very little space. **2210**, **2216** and **201** thermal-magnetic circuit breakers and **ESX10** and **REF16** electronic circuit protectors have an installation width of only 12.5 mm including integral auxiliary contacts, status and signal outputs.
- Electronic circuit protectors with active

current limitation limit the current flow both during the switch-on operation and in the event of overcurrent. The switch mode power supplies are reliably protected against voltage dips even in the event of high overcurrents.

- In addition to DIN rail mounted circuit breakers, E-T-A also offers plug-in type circuit breakers for the DC 24 V applications. Corresponding terminal blocks systems make wiring significantly easier. Collective feeds and series connections of auxiliary contacts can be implemented extremely quickly and easily.
- **ESS22-T**, **ESS30-S** and **ESS31-T** physically isolate loads from the supply voltage in the event of a failure. This provides an extra measure of safety in many applications.



Electronic circuit breakers and circuit protectors

ESS31-T electronic circuit breaker providing physical isolation

Provide selective overcurrent protection:
E-T-A electronic circuit breakers

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