

A Shortform Guide to E-T-A Circuit Protection and Sensors





Circuit Protection and Control



E-T-A is the world leader in the design, development and manufacture of circuit breakers for equipment protection (CBEs); high performance circuit breakers for aerospace, defence and other demanding requirements; and control products such as battery isolation switches and door interlock relays. E-T-A also manufactures a comprehensive range of electronic process sensors and instrumentation.

Today we offer one of the widest product ranges of its type on the market for applications as diverse as air, sea and land transportation; process control; ICT; medical equipment; domestic, hobby and garden appliances; machine tools and robotics.

E-T-A products are designed and manufactured to world class quality requirements and to the most stringent standards. Quality is built in at every stage and is verified by the latest automatic test equipment and SPC techniques. Product and quality approvals are held from respected authorities such as VDE, CSA, UL, BSI, UK Civil Aviation Authority and Bureau Veritas.

This short form brochure provides an overview of some of our standard product types which offer a choice of design, style, operating characteristics, mounting, termination and optional features. We also supply products for specialised requirements and can tailor designs to individual needs.

If you would like a full catalogue or further information on selected products and services, please call us on +49 (0 91 87) 10-0.



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E-T-A circuit breakers are designed for equipment, component and low voltage wiring protection. Their precision performance characteristics are ideally suited to applications for which other methods of protection are generally inadequate, these include:

- motors
- transformers
- solenoids
- printed circuit boards
- power supplies
- test equipment
- control instrumentation
- computers
- communications systems
- factory automation
- aircraft
- automotive systems
- defence equipment
- boats
- semi-conductors
- domestic/household appliances
- commercial equipment
- business machines
- medical equipment
- ...and many others

E-T-A Protection Reliable Performance for all Environments





Thermal Circuit Breakers



With simple operation through the heating effect of current, thermal circuit breakers offer one of the most reliable and cost effective forms of protection device available. As a result they are ideally suited to the protection of a broad range of components and systems – from motors and transformer windings, through printed circuit boards, to the low voltage power distribution circuits of road vehicles, boats, and battery powered machines.

Such applications all require the ability to discriminate between safe switch-on surges or transients on the one hand, and harmful sustained overloads on the other. Thermal circuit breakers can withstand high level surges, which arise from lamp loads or motor starting, for example. At the same time they afford protection against the effects of genuine failure such as motor locked rotors.

The characteristics of thermal CBEs can be matched closely to the ratings of the component or system they are protecting, eliminating the need for over-sizing of wiring and connectors, whilst offering dependable protection – even under low level overcurrent conditions which cannot be adequately provided for by other methods of circuit protection.

E-T-A thermal circuit breakers utilise one of three different mechanisms optimised for their range of operation

- a snap action disc type bimetal and contact assembly
- a bimetal with a mechanical latch and separate spring loaded contact
- a hot wire design with extremely fast switching time

All are individually calibrated in the factory to ensure safe, predictable performance under a wide range of conditions.

E-T-A thermal circuit breakers are available in manual or auto-reset types. Several models also combine the functions of circuit breaker protection and on/off switching in a single component. There is a choice of rocker, toggle or push button actuation according to user preference.

E-T-A's wide range of models enables the designer to make optimal selections according to specific performance, installation and styling needs.





Push to Reset 'R' Type Circuit Breakers.

104



Compact design,
integral or pcb
mounting
0.05A-10A

105



Compact design,
snap-in
panel mounting
0.05A-10A

106



Compact design,
threadneck
panel mounting
0.05A-10A

1140-E



Compact design,
integral mounting
3.5A-16A

1140-F



Compact design,
snap-in
panel mounting
3.5A-16A

1140-G



Compact design,
threadneck
panel mounting
3.5A-16A

1140-Gx5



Compact design,
threadneck panel
mounting,
2-pole switching
0.05A-16A

1180



Miniaturised design,
terminal block
mounting, optional
switch function
0.1A-10A

1410-G



Miniaturised design,
pcb or threadneck
mounting
0.63A-10A

1658



Industry standard
form, unique safety
benefits,
threadneck or
snap-in mounting
5A-35A

2-5700



Full feature type,
threadneck panel
mounting, optional
switch function
0.05A-35A

4130



Full feature type,
threadneck panel
mounting
20A-70A





Thermal Circuit Breakers

Switch 'S' Type Circuit Breakers

1110



Snap-in panel mounting, fuse holder cut-out dimensions push on/push off
0.05A-16A

1410-F



Miniaturised, snap-in panel mounting, tripped or 'on' illumination
0.63A-10A

2-5700-DD



Full feature type, threadneck panel mounting, push on/push off
0.05A-30A

3120-F-W



Snap-in, rocker operation, single and 2-pole, optional illumination and additional feature modules
0.1A-20A

3120-F-S



Snap-in, isolator style button operation, single and 2-pole, optional illumination and additional feature modules
0.1A-20A

3130



Compact design, snap-in, single, 2 or 3-pole, rocker operation, optional illumination
0.1A-20A

3130-F212



Waterproof, snap-in, rocker operation, optional illumination
0.1A-20A

3140



Snap-in, isolator style button operation, 3 and 4-pole versions
0.1A-16A

Push to reset 'R' Types, PCB Mounting Circuit Breakers

1410-L1/-G1



Miniaturised design, top button, threadneck type also available
0.63A-10A

1410-L2



Miniaturised design, side button
0.63A-10A

104-PR



Compact design, horizontal or vertical mounting
0.05A-10A



For Extra Low Voltage ($<50\text{v dc}$) Systems

1160



Socket mounting,
controlled reset
operation
12A-30A

1170



Full feature type,
socket mounting,
fuse block
compatible,
manual release
3A-30A

1610-21/H2



Socket mounting,
fuse block
compatible, Manual
release optional
6A-30A

1610-92



Socket mounting,
fuse block
compatible,
auto reset function
6A-30A

Socket 12



Rail or surface
mounting,
for types 1170
and 1610

129-L11



Full feature type,
bolt-on terminal
block mounting,
manual release
3A-25A





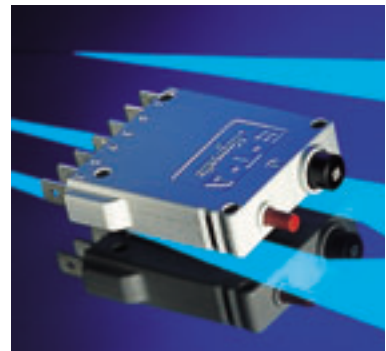
Thermal-Magnetic Circuit Breakers



A latching type bimetal is combined with a magnetic coil to provide the joint benefits of delayed operation for low level over-current protection and fast magnetic action on higher value short circuits

E-T-A has perfected thermal-magnetic technology to provide a choice of mounting options, covering an extensive range of current ratings all with high precision performance. These models are well suited to telecommunications, process control and other industrial applications where sophisticated equipment needs correct – and dependable – protection. The narrow profile of E-T-A thermal-magnetic circuit breakers enables high density packaging solutions.

Additional features to ensure perfect fit of device to application include options such as auxiliary contacts for status signalling and the choice of push button or toggle manual control. There are also single, two and multi-pole models in a range of types and variants. Plug-in versions provide a convenient means of positive circuit interruption by simply removing the circuit breaker – ideal for safety critical systems during maintenance and shutdown.



E-T-A thermal-magnetic circuit breakers for track mounting can be fitted to different standard rail designs, either direct in the case of combi-foot models, or with an E-T-A adapter.

Standard models are available in special configurations with separate thermal and thermal-magnetic circuits, providing capability for overload protection together with an independent control circuit, which may be operated in response to an external sensor input.





Reset 'R', Occasional Switch 'M' and Switch 'S' Types

201



Rail mounting,
slimline design, 'M'
type 2-button
operation
0.05A-16A

2210-S



Slimline design,
socket or panel
mounting, single
and multipole 'S'
type toggle
operation
0.1A-25A

2210-T



Slimline design,
combifoot rail
mounting, single
and multipole 'S'
type toggle
operation
0.1A-32A

**3120-x-W-M/
3120-S-M**



Rocker or isolator
style 'S' type button
operation,
as thermal type
3120 with added
fast acting
magnetic release
0.1A-16A

3300/3400



Threadneck
mounting, fast
acting or standard
characteristics, 'R'
type push button
operation
0.05A-16A

3600/3900



Socket or panel
mounting,
standard or low
resistance versions,
'M' type 2-button
operation.
1A-16A





Magnetic and Hydraulic Magnetic Circuit Breakers



The E-T-A range of magnetic CBEs, includes the miniature Printo-magnetic series (808) with extremely fast operating characteristics for printed circuit board applications, and series 8330, 8340 and 8345 for higher current duties.

Type 808 covers ratings from as low as 0.01 A up to 5 A with low internal resistance values. Its unique method of magnetic operation not only provides rapid response times, but is also suited to impulse disconnection for control applications.

Type 8340-G provides the option of either single round hole panel mounting or plug-in mounting utilising an E-T-A series 18 base. On/off control is by means of a push/pull button with visual indication of the off/tripped position. Types 8340-F and 8340-T, with industry standard dimensions and toggle actuation, are panel mounted with two fixing bolts (8340-F) or rail mounted with combi-foot (8340-T).

All models within the 8330, 8340 and 8345 range offer a choice of fast acting magnetic operation or hydraulically delayed switching characteristics which may be selected to suit a range of application requirements such as those of the telecommunications and process control industries, where precise and dependable protection of sophisticated systems cannot be compromised.



The 8330 is available in single and two pole models, multipole options are also available for types 8340 and 8345. Single, two and three pole models are available with various internal circuit configurations to provide status signal and relay trip functions.





Magnetic and Hydraulic Magnetic

808



Fast acting,
compact advanced
design,
pcb mounting
0.01A-5A

8330-F



Snap-in panel
mounting,
rocker operation,
single or 2-pole
0.1A-25A

8330-G



Threadneck
mounting, toggle or
push button
operation
0.1A-25A

8340-F



Industry standard
form, toggle
operation, single
and multipole,
choice of tripping
characteristic
0.02A-50A

8340-G



Threadneck or
socket mounting,
push/pull button
operation, single and
multipole, special
version for 110v dc.
0.02A-50A

8340-T

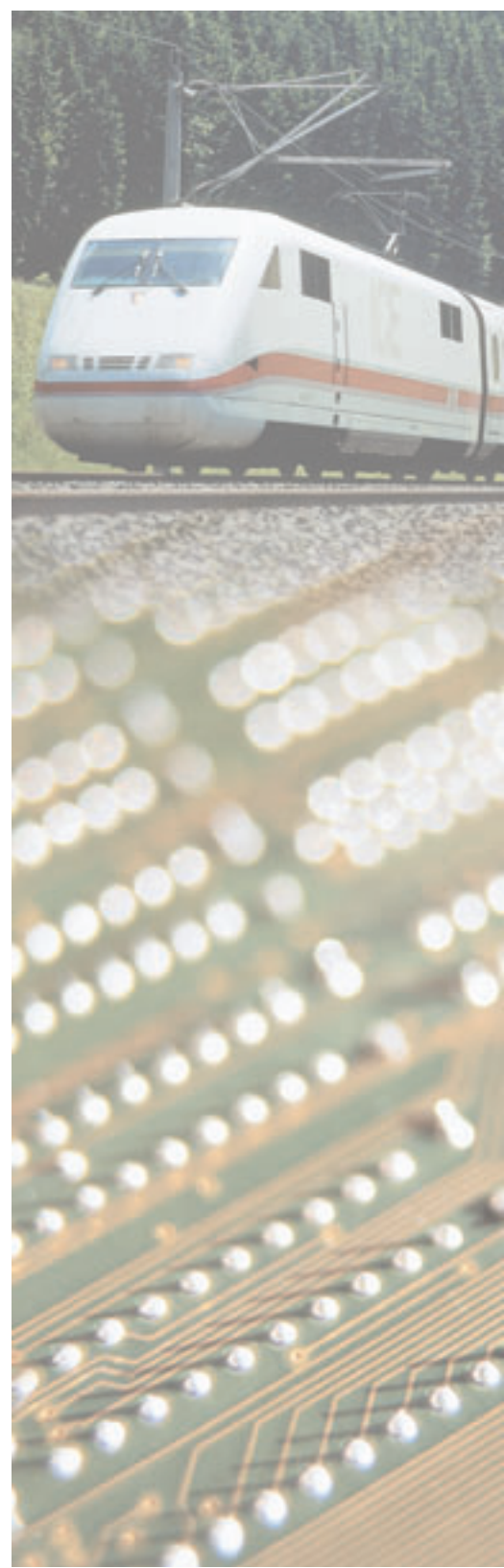


Combifoot rail
mounting, toggle
operation, single
and multipole,
optional auxiliary
contacts for
signalling
0.02A-50A

8345



Panel or stud
terminal mounting,
single and multipole,
choice of tripping
characteristics,
advanced design
0.1A-125A





High Performance Circuit Breakers



E-T-A high performance circuit breakers, of thermal or thermal magnetic operation, have been designed for applications with uncompromising performance and reliability requirements.

Models are available for aircraft, defence equipment, marine systems and other specialised equipment where safety is paramount.

All the circuit breakers in this series are highly resistant to the effects of shock, vibration, salt mist, humidity and similar influences. Their small physical size, low mass and advanced construction guarantee total versatility. Approvals are held from the supervisory authorities of key relevant industries. For example, E-T-A aircraft circuit breakers have been qualified for use in some of the world's most advanced aircraft, fixed wing and helicopters.

Accessories include panel seals providing various levels of protection for E-T-A single-hole panel mount models, from splash proofing right up to full immersion.

Complementing these high performance products, E-T-A battery isolation switches with remote control capability are especially suited to installation in the main battery systems of heavy duty vehicles – including tankers, boats, off-road plant and other battery powered equipment. Remote disconnection offers the dual benefits of user convenience and safety.





High Performance Circuit Breakers

413



Threadneck panel mounting, push/pull operation.
30A-90A

482



Threadneck panel mounting, push/pull operation.
0.1A-50A

452



Threadneck panel mounting, push/pull operation.
50A-100A

4120



Threadneck panel mounting, push/pull operation, temperature compensated, commercial aircraft specified
1A-25A

483



Threadneck panel mounting, push/pull operation, temperature compensated, unique design features, for all aircraft applications.
1A-35A

583



Three pole, threadneck panel mounting, push/pull operation, temperature compensated, unique design features.
1A-30A

446/447/449



Heavy duty types, thermal magnetic operation, base mounting.
30A-500A

410



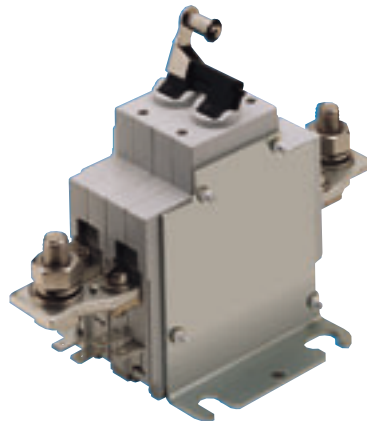
Single and multipole. Panel, rail or surface mounting.
7A-125A





Battery Isolation Switches

E-T-A Battery Isolation/Master Switches provide single and double pole disconnection for the electrical installations of boats, vehicles and battery powered systems. Electrical remote control, OFF only or ON/OFF, as well as local switching provide valuable safety and convenience benefits. Special configurations are available for special applications.



Battery Isolation Switches

437



Single pole, toggle operated switch/circuit breaker, with remote trip feature.

40-240A

911



Compact single pole with optional remote disconnection. Two and three pole models available.

921/922



Single or double pole with remote disconnection. Options include remote reconnection, undervoltage and/or overcurrent protection, with or without protective enclosure.

921/922



Protective enclosure option for 921/922, with manual control knob.

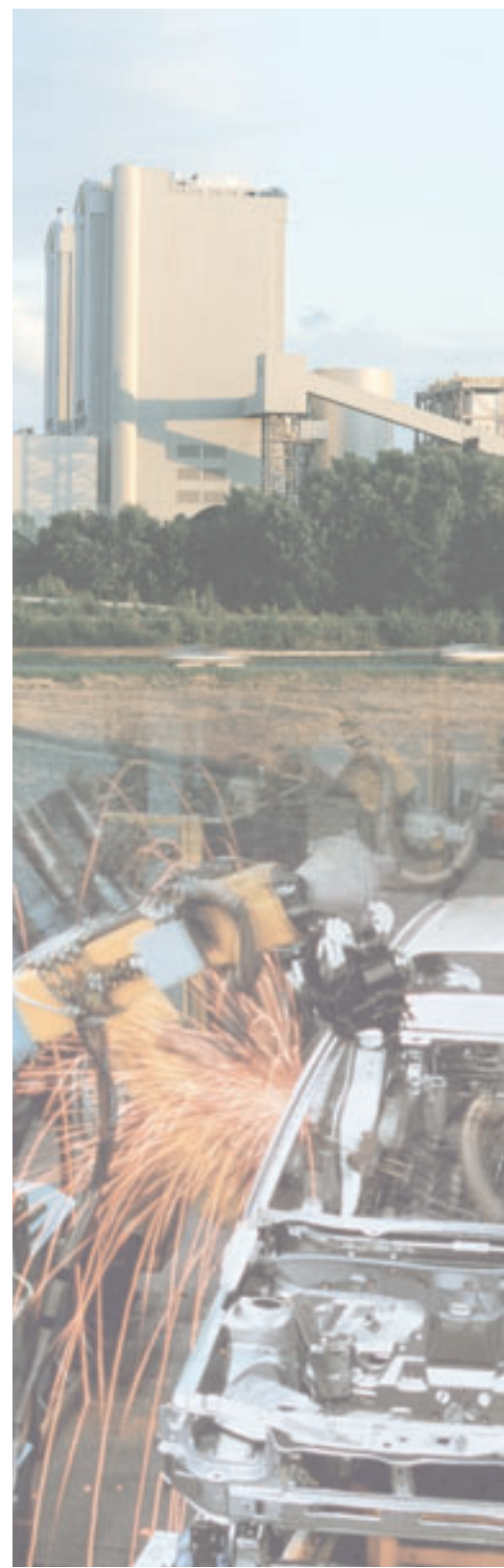
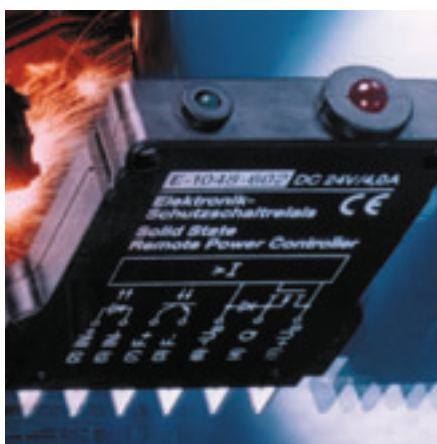


Solid State Remote Power Controllers

Electronic Circuit Breakers

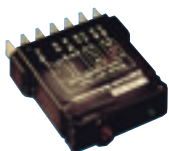
E-T-A solid state remote power controllers for DC 24 V-solenoids combine solid state switching with electronic overload protection and current limiting characteristics. Selected models also include electro-mechanical switching for applications which demand physical contact separation.

The electronic circuit breakers (DC 24 V) have been designed for the protection of programmable controller outputs, instrumentation, and process control switching circuits.



Solid State Remote Power Controllers

E-1048-600



Opto decoupled transistorised switching provides current limiting protection and signalisation
0.5A-4A

E-1072



Electronic current limiting, 2-pole physical isolation, eliminates inadvertent start up through ground faults in ungrounded systems

Electronic Circuit Breaker

ESS1



Micro-controller based electronic circuit breaker with unique benefits, for DC 24 V switch mode power supply protection. Provides electronic current limitation and physical isolation
3 A/6 A adjustable

Power Distribution System SVS1

ESS20



Electronic circuit breaker with a width of only 12.5 mm, for DC 24 V switch mode power supply protection. Provides electronic current limitation and physical isolation
3 A/6 A adjustable

Power Distribution System Module 17plus



Flow Meters and Level Sensors

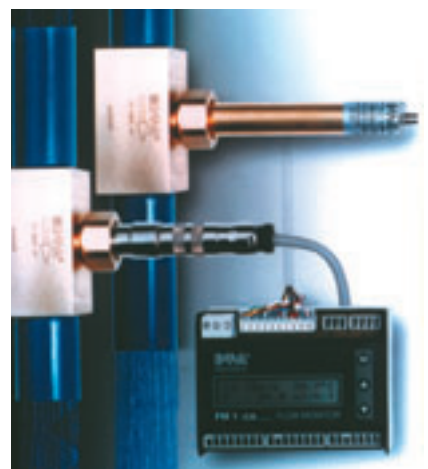


E-T-A electronic flow metering and monitoring systems are designed to measure and supervise the flow rate of gases and liquids in pipelines.

Models operating on the calorimetric principle avoid problems associated with moving parts in the flow stream and are therefore especially suitable for use with liquids of high viscosity, or containing particles or contaminants. Alternatively, high-precision turbine sensors are available for applications which demand accurate volumetric measurement.

E-T-A's flow meter/monitor programme offers a choice of specification, performance, size and cost to meet a wide variety of different uses and budget requirements.

All models are maintenance-free, ensuring fit-and-forget reliability and benefit from E-T-A's 25 year investment in process sensor research and development. E-T-A level sensors operate on capacitance change and provide min/max sensing capability for a wide range of applications.



NR 60



Minimum or maximum sensor. Transistorised output. For water, oil and similar fluids

NR 80



Non-invasive mounting. Transistorised output, minimum or maximum sensor, compact design

NR 100



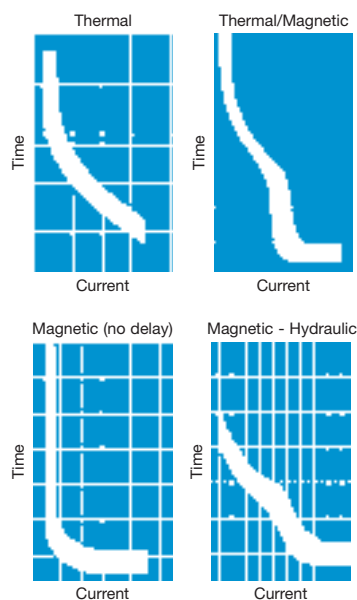
Transistorised output, minimum or maximum sensor, suitable for liquids, granules and powder including aggressive media and foodstuffs



The E-T-A Circuit Breaker Range Characteristics For All Applications

Current Ratings and Time/Current Characteristic Curves

Key selection criteria are the trip time zones determined at 23°C which are shown graphically for each E-T-A product on the relevant catalogue data sheet. Upper and lower curves show minimum and maximum adjustment tolerances. Unless otherwise stated, all thermal and thermal-magnetic circuit breakers will carry 100% rated current continuously and trip within one hour at 140% rating. Adjustment to closer tolerances is available to special order.



CE Mark

Those products from the E-T-A programme which are subject to the European Union EMC Directive have been CE marked since early 1996 to demonstrate compliance. In addition, from January 1997, models covered by the Low Voltage Directive have also been CE marked.



E-T-A Approved

E-T-A circuit protection products are designed according to IEC requirements for CBEs (IEC/EN 60934). These are defined as circuit breakers for equipment where unrestricted short circuits either cannot occur or are limited by back-up protection elsewhere in the system.

Most E-T-A models are fully approved by leading authorities including VDE, CSA and UL. Furthermore approvals are also held from specialised agencies such as the UK Civil Aviation Authority and Lloyds Register of Shipping.



E-T-A International

E-T-A is an international company, successful in world markets with offices and support personnel strategically placed around the globe. Our product specialists will be happy to assist with the selection of suitable products based upon a thorough evaluation of your engineering and commercial objectives.





Customised Solutions



Even as you read this, E-T-A products are hard at work in aircraft, marine vessels, land vehicles, telecommunications systems, medical equipment, factory automation and many more applications. Despite their diversity, all of these uses share one thing in common – an uncompromising demand for safety, performance and reliability. They rely on our unrivalled knowledge and expertise, gained through more than 50 years of engineering thermal, thermal-magnetic, magnetic and high performance circuit breakers for equipment (CBEs) and an associated range of control devices. This experience has helped to make the E-T-A trademark what it is today: a recognised symbol of quality and dependability, trusted worldwide to safeguard reputations.

We have hundreds of thousands of different circuit breaker configurations to choose from, complemented by accessories, terminal blocks and power distribution rails, which together represent one of the widest selections of products of their type available.

In addition we specialise in providing customised solutions designed to facilitate the installation and use of E-T-A products. This service extends from the design and manufacture of bus bars, switch panels and other accessory items to complete pre-wired distribution sub-racks and power control systems. Whatever the scale of your requirements, we will work with you to turn a design concept into a reliable and cost-effective solution.

Just a few examples of the ways in which we are already satisfying special applications are illustrated.





Customised Solutions

1. Sub-Rack Distribution System

The flexibility of our design and assembly service for 19" power distribution sub-racks and similar requirements recognises the unique nature of every customer's needs. We can offer solutions to accommodate a wide variety of E-T-A Circuit Breakers for Equipment (CBEs) and Solid State Power Controllers with current limiting characteristics, as well as other interconnection, measuring and control devices. Within a standard rack width up to 30 E-T-A CBEs can be installed, if necessary all with auxiliary contacts, without any size penalty. What's more, many E-T-A CBEs and Power Controllers provide the convenience of plug-in installation enabling 'hot' interchange without powering down.

2. Switch Circuit Breaker Mounting Panels

4, 6, 8 and 10-way switch/circuit breaker mounting panels for vertical or horizontal fitting. These can be supplied with self-adhesive legends for marine applications, while other legends can be supplied to order.

3. Circuit Breaker Accessories

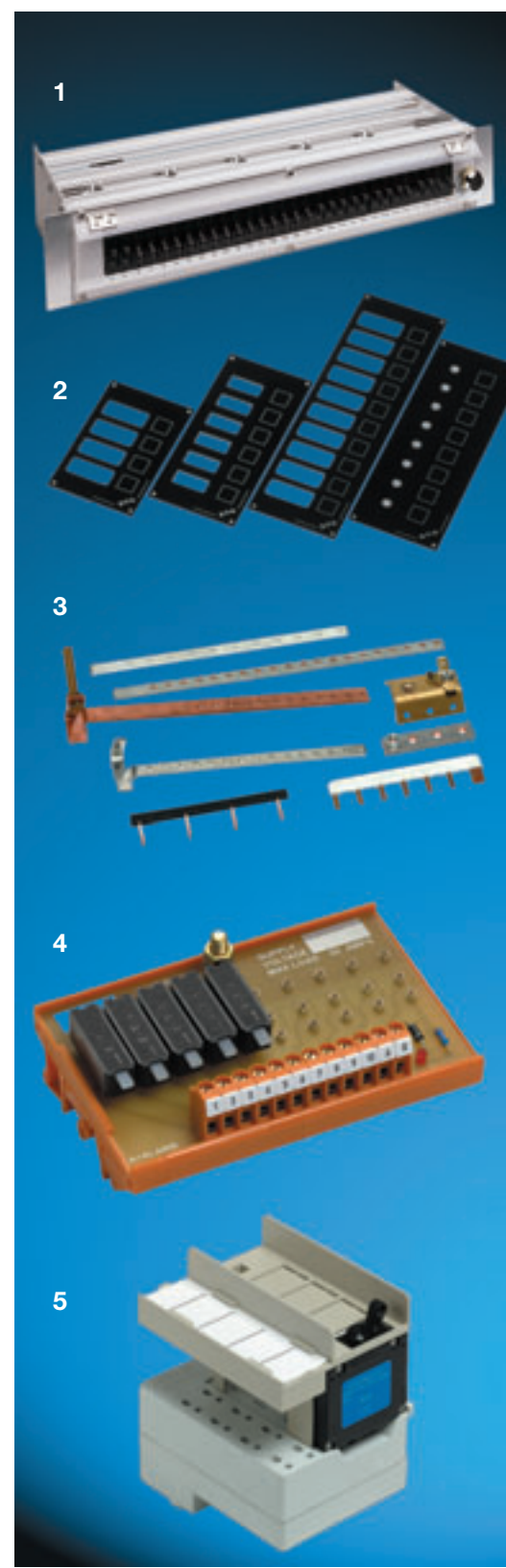
E-T-A customers have a wide range of standard and customised labour saving products to choose from including various bus bars, mounting brackets and terminal adapters. If you cannot find what you need in our catalogue we will be happy to look at providing a purpose designed solution for you.

4. Rail Mounted Circuit Breaker Assembly

An EN/DIN rail modular assembly featuring up to 10 E-T-A fast acting circuit breakers, pcb plug-in mounted and with LED status indication. These provide the convenience of circuit breaker operation for DC applications and are especially suited to the telecommunications and process industries.

5. Distribution Rails

E-T-A distribution rails have been specially designed for use in telecommunications, automation, data, and control systems applications. Accommodating E-T-A circuit breakers which can be 'hot-swapped' in complete safety, these rails - incorporating all necessary interconnections - provide design engineers with unrivalled choice and flexibility.



Innovative Circuit Protection & Systems Solutions

