E-T-A®
ENGINEERING TECHNOLOGY

A Shortform Guide
to E-T-A Circuit Protection

● transportation ● medical ● communications ● process control ● manufacturing automation ● equipment

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 electronic circuit breakers. 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, CQC 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 do not hesitate to contact us.

Contents

E-T-A Protection
Reliable Performance for all Environments

The extent of our product range, and the capability we have to offer bespoke solutions, enable us to match our customers' requirements with the correct choice of circuit protection to ensure that safety is never compromised. Our business is structured around our core competences in

- Transportation
- Communication
- Equipment
- Automation

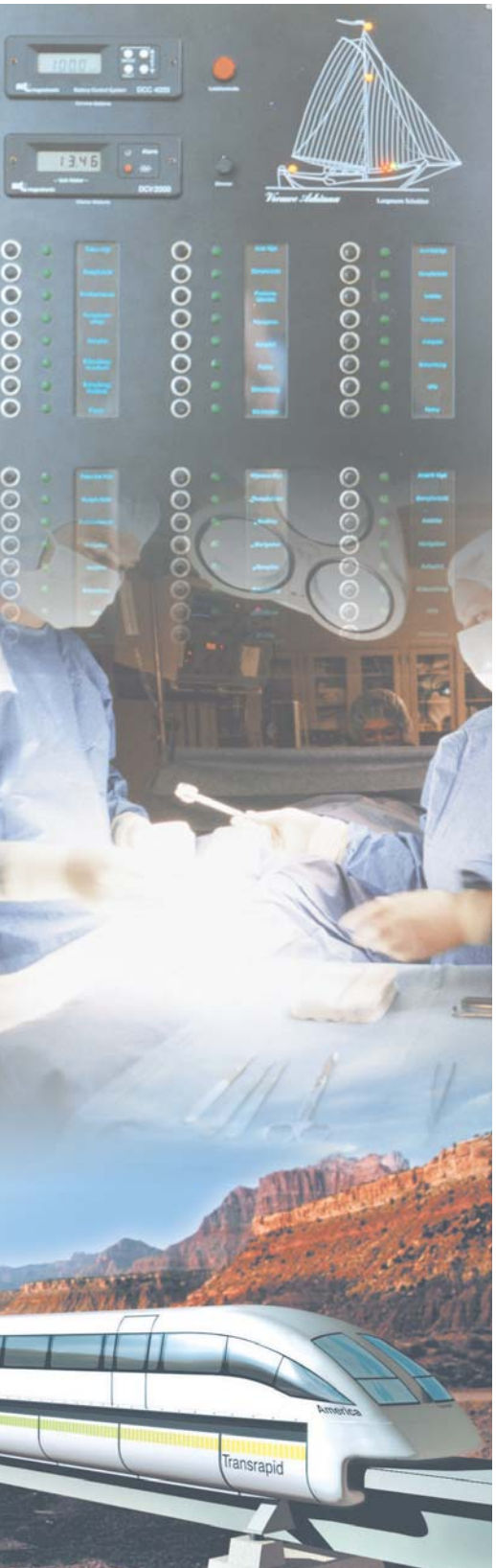
Each is served by a dedicated team of experts operating globally to provide specialised applications advice to our customers, wherever they are.

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

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
0.05 A-10 A

105

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

106

Compact design, threadneck panel mounting
0.05 A-10 A

1140-E

Compact design, integral mounting
3.5 A-16 A

1140-F

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

1140-G

Compact design, threadneck panel mounting
3.5 A-16 A

1140-Gx5

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

1180

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

1410-G

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

1658

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

2-5700

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

4130

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

Pictures shown do not represent actual sizes.

Thermal
Circuit Breakers

Switch 'S' Type
Circuit Breakers

1110

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

1410-F

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

2-5700-DD

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

3120-F-W

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

3120-F7

E-T-A's proven type 3120 in a new attractive styling, snap-in, rocker actuation, illumination optional, add-on modules available
0.1 A-20 A

3130

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

3131

Combined switch and circuit breaker, 'soft feel' rocker actuator, water splash protection, matching 3-position-switch version, choice of marine legends
0.1 A-20 A

3140

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

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

1410-L1/-G1

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

1410-L2

Miniaturised design, side button
0.63 A-10 A

104-PR

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

For Automotive and other Extra Low Voltage Applications (<50v dc)

1160

Socket mounting, controlled auto reset operation
12 A-30 A

1170

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

1610-21/-H2
1616-21/-H2

Socket mounting, fuse block compatible, manual release (-H2)
5 A-40 A

1610-92
1616-92

Socket mounting, fuse block compatible, auto reset function
5 A-40 A

1620/1626

Mini fuse block compatible, auto reset, modified reset and meets SAE J553 requirements
6 A-30 A

Socket 12

Rail or surface mounting, for types 1170 and 1610/1616

129-L11

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

E-1048-8C

Relay combining electronic switching with overcurrent protection and status indication. Designed for use with standard automotive relay sockets
1 A-25 A

E-1048-8D

Miniaturised relay combining electronic switching with overcurrent protection. Designed for use with standard automotive relay sockets
1 A-30 A

BMS01

Battery master switch, especially suitable for vehicles designed to transport dangerous goods, in accordance with ADR 2007, integral EX-approved safety barrier

437

Single or double pole with remote disconnection. Remote reconnection optional, undervoltage and/or overcurrent protection

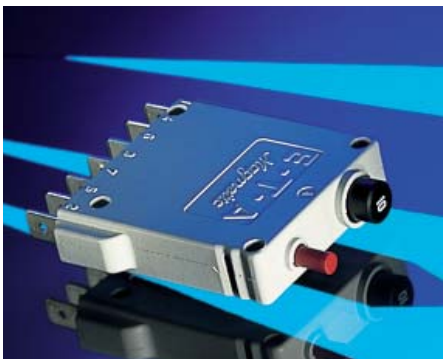
Pictures shown do not represent actual sizes.

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
0.05 A-16 A

2210-S

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

2210-T

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

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
0.1 A-16 A

3300/3400

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

3600/3900

Socket or panel mounting, standard or low resistance versions, ‘M’ type 2-button operation
0.05 A-16 A

4220-T

Track-mountable, single, double and three pole versions, auxiliary contacts optional, UL 489 approved
0.1 A-32 A

2216-S

Socket mounting, rail mounting with sockets 80plus and 81plus, slide actuator, aux. contacts optional
0.5 A-16 A

Pictures shown do not represent actual sizes.

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, as well as series 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 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.

Single and two pole models as well as multipole options are available for

type 8345. Add-on modules for auxiliary contact function, remote trip and for remote ON/OFF actuation extend its versatility.

DC110V versions of types 8340 and 8345 are the ideal choice for railway applications.

Magnetic and Hydraulic Magnetic

808

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

8340-F

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

8340-G

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

8340-T

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

8345

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

X8345-F

Remote trip module for type 8345, snap fitted to the rear of the housing. DC 12 V and DC 24 V operated, for use with AC and DC circuit breakers

X8345-S

Auxiliary contact module for type 8345 for signalling function, snap fitted to the rear of the housing

X8345-R

Provides remote ON/OFF actuation for series 8345. The module actuator, which is motor-driven, is factory fitted adjacent to the circuit breaker(s) which it is controlling

Pictures shown do not represent actual sizes.

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.

High Performance Circuit Breakers

413

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

482

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

452

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

4120

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

483

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

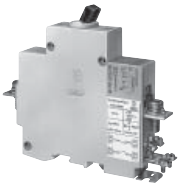
583

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

446/447/449

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

410



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

4140

Threadneck panel mounting, push/ pull operation, temperature compensated, robust design, suitable for extremely harsh conditions
20 A-50 A

5140

Three pole, threadneck panel mounting, push-pull operation, temperature compensated, robust design, suitable for extremely harsh conditions
20 A-50 A

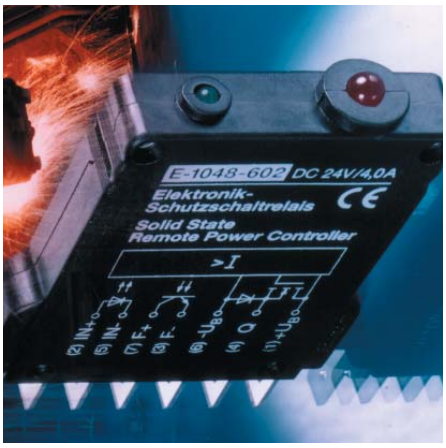
4930 (RCCB)

Single pole remote control circuit breaker, auxiliary contacts optional
5 A-100 A

Pictures shown do not represent actual sizes.

Solide State Remote
Power Controllers

E-T-A solid state remote power controllers for DC24V 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. Wire breakage monitoring is optional, faults may be indicated electrically and visually.



Solid State Remote Power Controllers

E-1048-600

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

E-1048-700

Transistorised switching device providing load protection, wire break monitoring and signalling
0.5 A, 1 A, 2 A, 4 A

E-1048-8I.

Remotely controllable load disconnection relay, combining the functions of electronic relay, with overcurrent protection and status indication
1 A-20 A

E-1048-8S

Remotely controllable load disconnection relay, designed for installation in IP-protected enclosures, group fault output optional
1 A-25 A

E-1072

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

E-1071-623/627

Electronic controller for inductive DC 24 V loads. Provides reliable and fast switching and monitoring of loads

E-1071-623/627

Electronic controller for inductive DC 24 V loads. Provides reliable and fast switching and monitoring of loads

Electronic Circuit
Breakers & Protectors

These electronic circuit breakers and protectors (DC24V) have been designed for the protection of programmable controller outputs, instrumentation, and process control switching circuits. The E-T-A types ESS1 and ESS20 ensure selective disconnection with positive physical isolation in the event of a fault (overload or short circuit) while permitting the start-up of currents of individual load circuits. The ESX10, ESX10-T and REF16-S offer similar performance with electronic switching.

Electronic Circuit Breakers

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
1 A-10 A
3 A/6 A adjustable

Power Distribution System Module 17plus

ESX10

Electronic circuit protector providing selective disconnection of DC 24 V load systems and active current limitation, status and failure indication is by means of a multicolour LED
0.5 A-12 A

Power Distribution System Module 17plus

ESX10-T

Track-mountable electronic circuit protector providing selective disconnection of DC 24 V systems and space-saving design
0.5 A-12 A

ESS22-T

Track-mountable electronic circuit breaker, double pole, providing physical isolation, active current limitation and selective load protection
0.5 A-10 A

REF16-S

Electronic overcurrent protector, plu-in type, track-mountable with sockets 80plus and 81plus,
for DC 24 V systems
0.5 A-10 A

Pictures shown do not represent actual sizes.

Power Distribution
and System Solutions

E-T-A today not only manufactures circuit breakers and controls, but has also established an excellent reputation as a supplier of system solutions. A wide range of power distribution systems and rails have been designed which in combination with E-T-A circuit breakers provide optimum equipment protection. These system solutions feature pre-wired termination technology to save time and money in control cabinet design.

X8345-D01

Power distribution system, max. total current 600 A, for use with hydraulic-magnetic circuit breaker 8345, load output max. 125 A

Module 17plus

For plug-in type circuit breakers, rail mounting, suitable for side-by-side mounting, integral pre-wiring for signalisation, with pluggable busbar up to 50 A

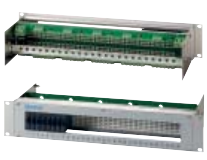
SVS02

Power distribution system with 4 to 16 channels, for electronic circuit breakers type ESS20/ESX10, with load terminals for plus minus and ground, signalisation pre-wired

SVS04

Customer-specific power distribution system for 4 or 8 channels for electronic circuit breaker types ESS20/ESX10, with multiple load terminals per channel for plus and minus and pre-wired signalisation

Power-D-Box PCB version



2U power distribution system for plug-in type circuit breakers, 3600/3900, ESX10-S, ESS20, pre-wiring of supply feed and auxiliary contacts optional, redundancy possible

High Power-D-Box

Compact 2U power distribution system for plug-in type circuit breaker 8345, ratings up to 125 A, standard redundant design, group signalling

Economy Power-D-Box

Compact 2U power distribution system for plug-in type circuit breaker 8340-F, standard redundant design, group signalling

SBG-E-1048-05-V0025

Customer-specific pcb-mounted system solution for the special vehicle market, accommodating Smart Power Relay E-1048-8D, automotive circuit breakers 1610 and 1170 and standard relays.

Customised
Solutions

E-T-A is a specialist in the field of system technology. What does this mean exactly? System technology means the combination of various crucial elements required for power distribution and protection in one device, at the same time providing a space-saving and efficient design.

System solutions can be:

- tailored to customer's needs, only requiring connection
  – following the principle »plug and play«
- our SVS power distribution system providing optimised power distribution, selective overcurrent protection and intelligent signalling in a track-mountable design
- a complete control cabinet, accommodating power distribution in an even more compact and space-saving design, e.g. in a so-called BonsaiCabinet®.

The basis of your electrical design starts with selecting the circuit protection element ideally suited to your needs. Our specialists will of course be pleased to support you.

Once you have decided on a power distribution system, we will also support you with the suitable design of the enclosure. This included sketches, wiring diagrams, thermal optimisation and 3D CAD models. Your customised solution will be designed around your required dimensions, connections, terminations and individual markings – providing you with the optimal solution for your application.

Power Management
E-T-A *PowerPlex*®

In addition to our programme of circuit protection and control products, and customised systems, we have introduced a complete power management system – ***PowerPlex***® - for specialised applications such as recreational boats and vehicles as well as work boats.

Why E-T-A *PowerPlex*®

Growing demands for convenience and functionality, coupled with the need to reduce the size and weight of on-board electrical installations, demand a new approach for marine systems. The E-T-A ***PowerPlex***® will both dramatically reduce the amount of conventional wiring required and will greatly facilitate the installation of the additional equipment, expected by today's owners, into a well integrated system.

E-T-A's proven experience in this market, supported by a worldwide sales, engineering and support network enables us to offer an unrivalled level of service.

What are the advantages for the boat owner?

The E-T-A ***PowerPlex***®is an advanced digital system with extensive control and diagnostic capability. The boat owner benefits from greatly improved reliability, functionality and convenience. Remote communication with the boat is facilitated to enhance security and provide a wide range of control and feedback possibilities. The E-T-A ***PowerPlex***® can be integrated with traditional looking switch panels or touch screen displays, according to the preferences of the specifier.

What is E-T-A PowerPlex?

The E-T-A ***PowerPlex***® is a decentralized, user configurable power distribution system. It is optimized for marine applications based on CAN-Bus technology (SAE J1939). Ease of configuration by means of the E-T-A configuration software running on a standard Windows PC offers individual solutions for every boat. The E-T-A ***PowerPlex***® provides switching and controlling, timer functions, real load status indication, overcurrent protection and wire break detection. Each function is individually programmable to fit the requirements of the different loads.

Example for a touch panel design

E-T-A PowerPlex

E-T-A DC Disconnects
for Photovoltaic Applications

There is a growing demand for high-capacity DC disconnects fitted between the solar power modules and the power inverters, which are referenced in photovoltaic system standards. In addition it was our goal to allow reliable physical isolation of DC 1000 V in a very compact design.

E-T-A's DC Disconnect PV product group meets the challenge. It features hybrid technology and has specifically been designed for the photovoltaic market and its typical DC applications. Its enclosure is track-mountable and ideally suited for installation in distribution boxes.

The electronic control unit will interrupt the circuit, the mechanical part ensures single or double pole physical isolation, making this technology also suitable for both grounded and ungrounded systems. In addition the hybrid function allows reliable disconnection in the event of low currents and ensures a low-wear contact system. The hybrid functional principle does not require an additional power supply for the electronic unit.

The modular design allows other versions and variants such as remote control (PVREM-…), firefighter switch (PVSEC-…) and/or arc fault detection as well as status indication. It is also possible to use the product in inverters with a modified enclosure or a modified mounting method – please enquire.

DC Disconnects

PVDIS-…
Double pole DC Disconnect on hybrid basis and integral fail-safe element, track-mountable. Maintenance-free, reliable and rugged design. Rated operational voltage DC 1000 V.
Rated current: up to 30 A

PVSEC-…
Firefighter safety switch version of a double pole DC Disconnect; allowing deactivation of the DC part of a photovoltaic system in the proximity of the modules (or directly below the cable outlet). It helps to reduce risks and difficulties during fire fighting or technical aid.
Rated current: up to 30 A

PVREM-…
Double pole DC Disconnect with remote control function, available for use in photovoltaic systems up to max. DC 1000 V and 30 A. It provides straightforward mounting as it can be snapped onto standard rails and its compact dimensions help to save space in distribution boxes.
Rated current: up to 30 A

E-T-A
Worldwide Service Network

Europe
- Austria
- Belgium
- Bosnia-Herzegovina
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Hungary
- Ireland
- Italy
- Luxembourg
- Macedonia
- Montenegro
- Netherlands
- Norway
- Poland
- Portugal
- Russia
- Serbia
- Slovakian Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom

America
- Argentina
- Brazil
- Canada
- Chile
- Mexico
- USA

Asia
- Brunei
- China
- Hong Kong
- India
- Indonesia
- Japan
- Korea
- Malaysia
- Philippines
- Singapore
- Taiwan
- Thailand

Africa
- South Africa
- Tunisia

Oceania
- Australia
- New Zealand

E-T-A ENGINEERING TECHNOLOGY

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