

E-T-A - enhancing the safety of your photovoltaic system





Innovative products for the photovoltaic market



The E-T-A DC Disconnect Range

Reliable Disconnection of Photovoltaic Systems

The DIN VDE 0100-712 requires DC disconnects for any photovoltaic (PV) system. Normally these are installed directly within the power inverter [6] or in its proximity. This means that DC cables [3] on the side of the PV generator [1] remain live when the sun is shining even when the DC Disconnect has switched off. In order to reduce these cable lengths to a minimum, E-T-A recommends installing the DC Disconnect (with remote control and/or zero voltage release) near the PV generator in the protected outdoor area or directly below the cable outlet [2].

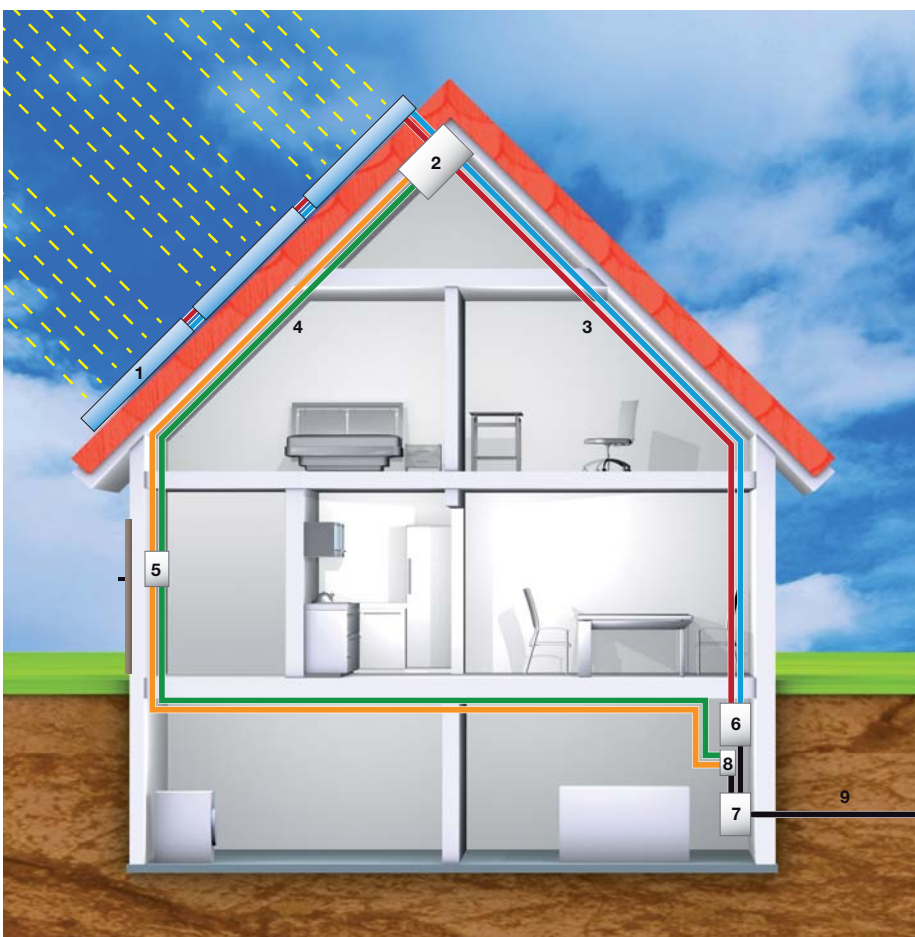
This allows disconnection and reliable de-energisation of the DC cables throughout

the entire building. Any hazard of electrocution, whether it is through fire, high water or technical aid, is minimised or eliminated completely.

Contrary to a pure remote ON/OFF actuation, the firefighter switch automatically switches off in the event of a disconnection from the mains power supply [7, 8, 9], or by manual operation, e.g. via an emergency stop and/or a fire alarm box [5]. Even an interruption of the control cables [4] will lead to de-energising the DC cables. In the event of inadvertent voltage dips or ruptures on the mains side, a motor actuation will provide automatic restart and a smooth operation of the PV system.

E-T-A's version with integral arc fault detection does even more to provide fire prevention. This type of technology fully meets the rising safety and protection requirements and switches off the PV system before a hazard caused by DC arc faults arises.

Contrary to many competitive products, E-T-A's full range of PV products has been specifically designed to meet the requirements of the PV market.



1. PV generator
2. Combiner box with firefighter switch PVSEC-...
3. Wiring on the DC side
4. Control cables for PVSEC-...
5. Emergency stop and / or fire alarm box
6. Power inverter
7. Wiring on the AC side and fusebox / building connection
8. DC 24 V power supply
9. Mains

Our competence – your benefit

- Innovative standard components for disconnecting and monitoring
- Individual tailor-made solutions for an inclusion in your system, e.g. with arc fault detection on printed circuit board
- Design partnerships and co-operations for your specific requirements

E-T-A Type PVDIS-...

DC Disconnect for photovoltaic systems

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 1,000 V in a very compact design.

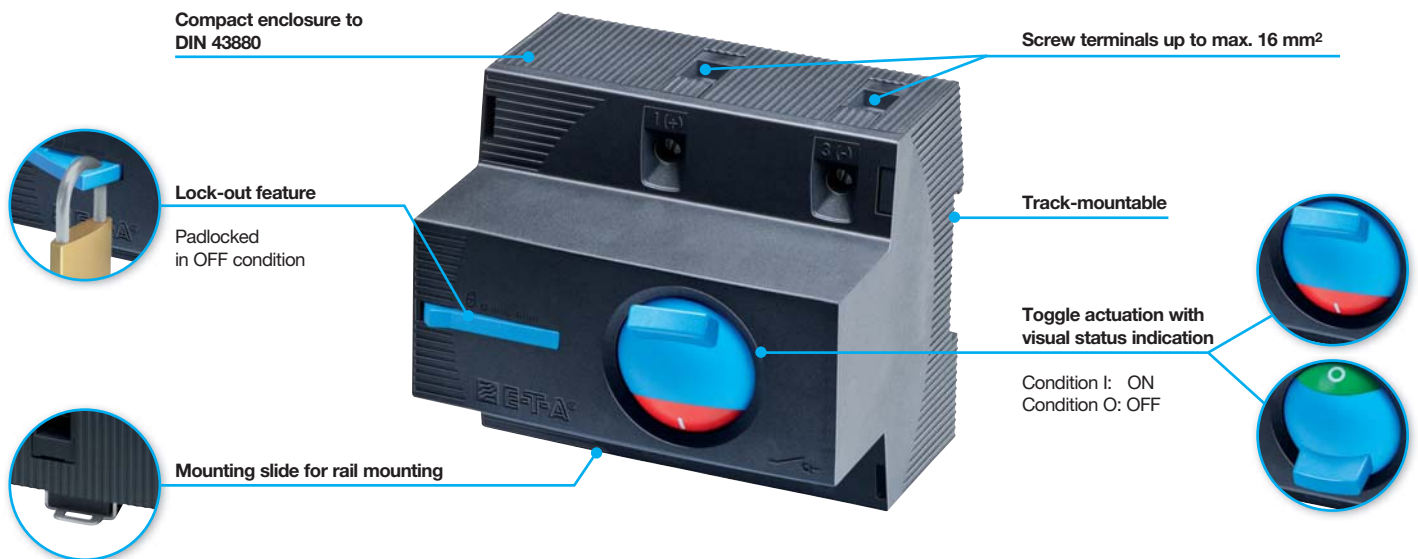
E-T-A's new DC Disconnect PVDIS-... meets the challenge. It features hybrid technology and is the first E-T-A product specifically designed for the photovoltaic market and its typical DC applications. Its enclosure is track-mountable and ideally suited for installation in distribution boxes.

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, firefighter switch 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.

Your benefit

- Designed explicitly for the photovoltaic market and its requirements
- DC Disconnect on hybrid basis and integral fail-safe function
- Robust and reliable design
- Also available as DC Disconnect with remote control and as firefighter switch



PVDIS-...

E-T-A Type PVREM-...

DC Disconnect for PV systems with remote control

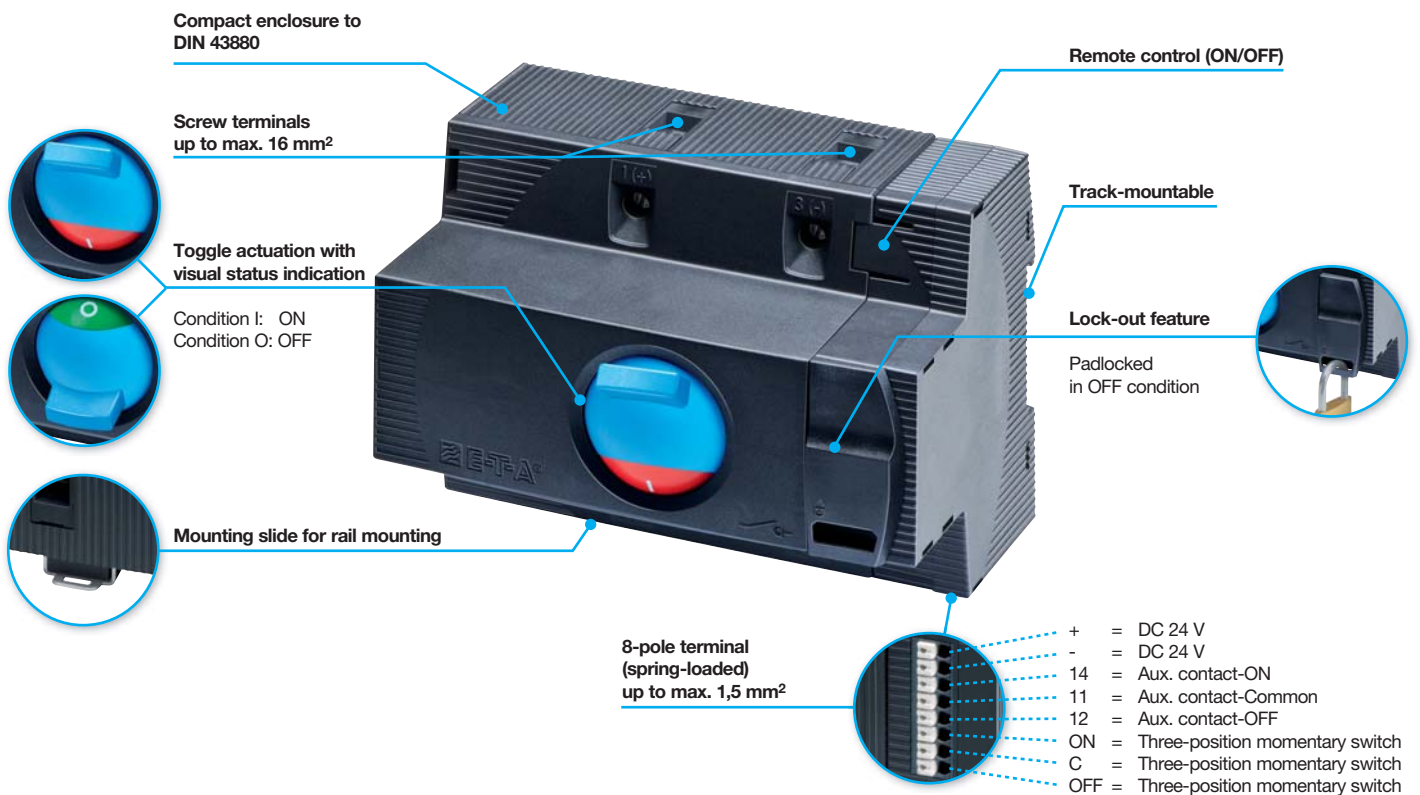
Reliability and endurance are critical in technical applications, but they are particularly important in photovoltaic systems. E-T-A's DC Disconnect PVDIS-..., which has been designed for photovoltaic applications, has proven itself to the market. The powerful base unit can be adjusted to customer's needs with its modular design. In order to provide a remote control function the electronic control unit will receive a command via an external change-over switch (ON/OFF switch, not part of the product) and the motor will switch the DC Disconnect on or

off. It must be ensured the supply voltage in the application is maintained without fail. Information on the switch position can be transmitted to a centralised control room via an auxiliary contact (change-over contact).

The DC Disconnect with remote control function is available for use in photovoltaic systems up to max. DC 1,000 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.

Your benefit

- Base unit is the DC Disconnect on hybrid basis
- Integral fail-safe function
- Remotely controllable via change-over switch or momentary switch
- Visual status indication on the Disconnect and by means of the momentary switch (change-over auxiliary contact)
- Also available with arc fault detection



PVREM-...

E-T-A Typ PVSEC-...

Firefighter Switch for PV systems

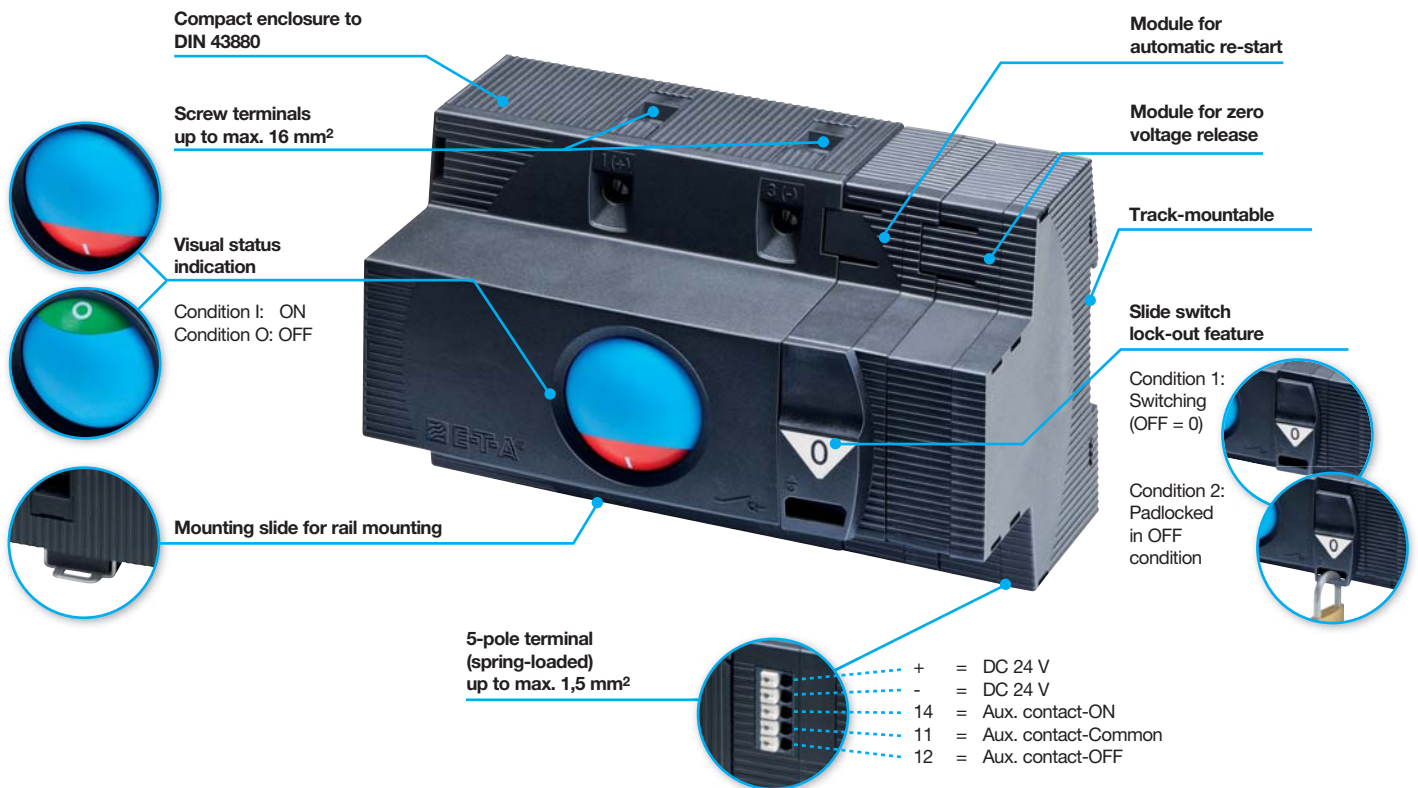
A firefighter switch is a device allowing deactivation of the DC part of a photovoltaic system in the proximity of the modules (or directly below the cable outlet). It helps to reduce risks and difficulties during fire fighting or technical aid. Deactivation of the strings occurs immediately after disconnection of the power supply. An automatic restart ensures smooth and undisturbed operation of the photovoltaic system even in the event of voltage interruption unless there is a manual switching operation. The restart also allows reliable and safe

operation of more than one switch, even firefighter switches which are difficult to access. The integral change-over auxiliary contact transmits status information to a centralised control room.

The firefighter switch is available for use in photovoltaic systems up to max. DC 1,000 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 – a benefit particularly helpful for the installation in distribution boxes.

Your benefit

- Base unit is the DC Disconnect on a hybrid basis
- Actuators can be installed anywhere (building connection, Central Indicating Equipment etc.)
- Integral fail-safe function
- Status indication on firefighter switch and actuator (change-over auxiliary contact)
- Also available with arc fault detection option



PVSEC-...

E-T-A Typ PVREM-...-AF1 und PVSEC-...-AF1

Fire prevention through arc fault detection

Arc faults are a potential hazard in photovoltaic systems because of the high DC voltages and currents. Arc faults, mostly serial ones, are often caused by defective modules or connectors (counterfeit or copies) and by defective cables because of ageing, animal bite and hail. This may lead to a fire in other components of the system and their surroundings (i.e the roof). In order to have efficient preventive fire protection, E-T-A has designed several possible solutions to monitor the entire DC side of a photovoltaic system and help to enhance the overall safety and reliability.

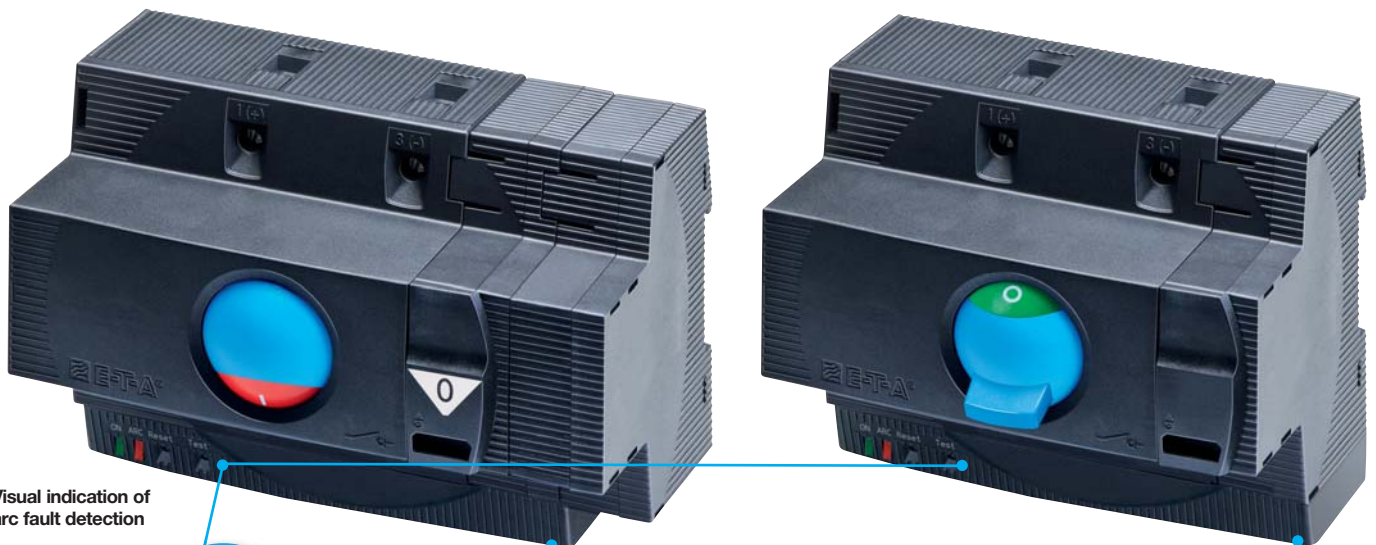
Serial arc will be detected, extinguished and indicated before any safety-critical situations can arise. The arc fault detection feature (UL 1699B) is available in combination with the DC Disconnect with remote control and with the Firefighter Switch up to max. DC 1,000 V and 30 A. In addition E-T-A can provide customer-specific printed circuit board (PCB) versions.

Your benefit

- Explicitly designed for the photovoltaic market and its requirements
- Fire prevention – E-T-A provides protection against arc fault damages
- Two basic versions (detection, indication and disconnection)
- Specified for different system configurations and power inverters
- Arc fault detection (detect and distinguish between serial and parallel and indicate) is also available as a customer-specific solution on printed circuit board



Example of a customerspecific arc fault detection on pcb basis



Visual indication of arc fault detection

- LED »On«
- LED »Arc«
- Momentary switch »Reset«
- Momentary switch »Test«

5-pole terminal (spring-loaded) up to max. 1,5 mm²

- + = DC 24 V
- = DC 24 V
- 14 = Aux. contact-ON
- 11 = Aux. contact-Common
- 12 = Aux. contact-OFF

8-pole terminal (spring-loaded) up to max. 1,5 mm²

- + = DC 24 V
- = DC 24 V
- 14 = Aux. contact-ON
- 11 = Aux. contact-Common
- 12 = Aux. contact-OFF
- ON = Three-position momentary switch
- C = Three-position momentary switch
- OFF = Three-position momentary switch

PVREM-...-AF1
PVSEC-...-AF1

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



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