GRIDCON® DCT

DC TRANSFORMER FOR SMART AND EFFICIENT DC POWER APPLICATIONS

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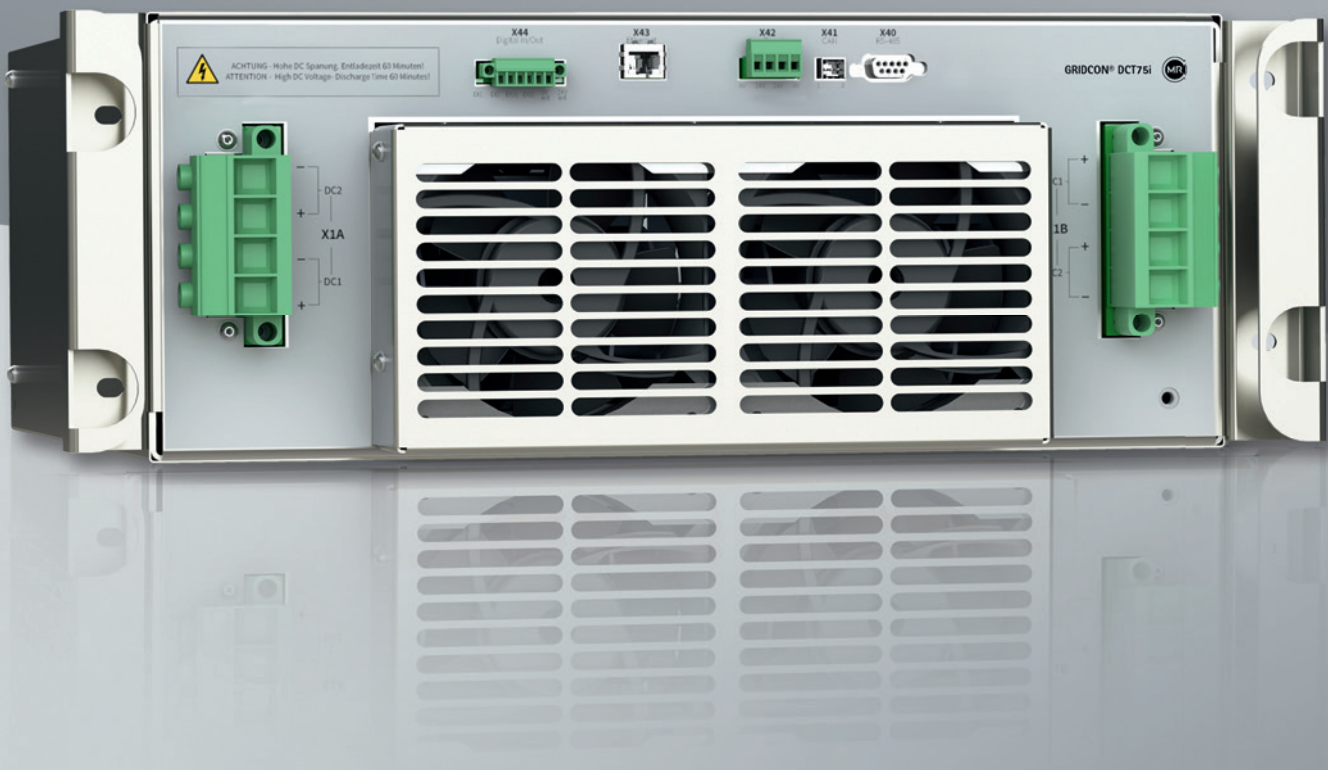
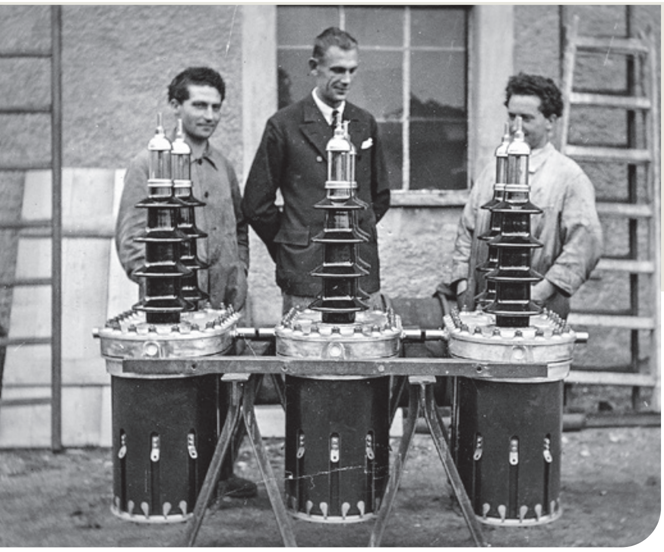


SO MANY FIRSTS!

Innovative technology developments in global niches of the energy industry since 1929.

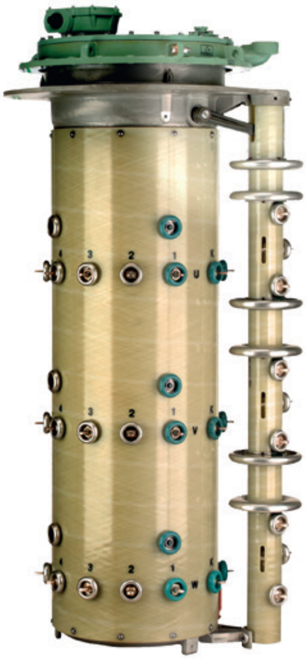


1929

First on-load tap changer based on the resistor principle

1974

First semiconductor tap changer



2000

First resistor-type tap changer with vacuum technology for oil-filled transformers

2012

First series solution for local grid regulation transformers

2014

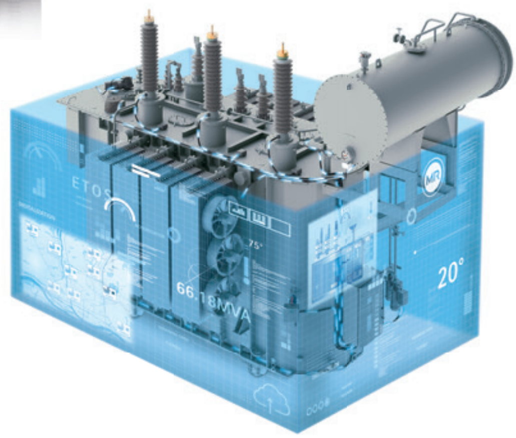
First full semiconductor tap changer

2017

First modular power conversion system with active, voltage controlled harmonic compensation

2018

First open operating system, ETOS®, for the digitalization of transformers



2021

First galvanically-isolated DC/DC converter that behaves similarly to a regulated power transformer used for AC grid applications

GRIDCON® DCT meets the high safety requirements placed on DC charging stations for electric vehicles thanks to its galvanic isolation. Its high efficiency and the possibility of bidirectional power flow make it particularly suitable for this application.

Uniquely innovative is the combination of these properties with the functional enhancements of the GRIDCON® DCT which, among other things, enable the operating mode of a controlled transformer for DC grids. Analogous to the conventional AC world, DC grids of different voltages and even different grid configurations can now be connected, with targeted control of voltage levels and load flow, and reliable control of faults.

DC MICROGRIDS.

Local, self-supplied and sustainable energy systems

DC microgrids allow grid-independent power supply of districts, charging infrastructure, industry and much more, and can be a great benefit in areas with unpredictable supply constraints. They also allow local, sustainable energy sources, such as PV systems, to be directly coupled with decentralized energy storage systems. DC interconnection reduces conversion losses and increases the revenue from sustainably generated energy. The number of individual components required is reduced to a minimum and can be expanded as needed. In the event of a supply failure, the DC microgrid remains energized. The coupling of DC microgrids via an AC/DC converter with an AC grid enables a controllable power supply from the utilities. This ensures high self-consumption of the electrical energy available in the DC microgrid. The power grid is minimally loaded and the need for grid expansion is lower and more predictable.

Benefits of DC microgrids:

- Independence and flexibility in grid expansion
- Efficient coupling of generation, storage and consumption
- Self-sufficient energy supply

INDUSTRIAL DC GRIDS.

Competitiveness through reliability and efficiency

The industrial energy supply must be particularly reliable, as even short power outages often cause high costs. At the same time, the focus is on high system efficiency, because the cost of electrical energy as well as the CO_2 footprint are central factors for the competitiveness of products. Since many consumers in industrial networks operate internally with direct current, power supply from DC networks is less complex and at the same time more efficient than with conventional AC networks.
By eliminating conversion steps, losses can be avoided, and space for converters can be saved. Furthermore, braking energy from industrial processes can easily be fed back into a DC grid and energy storage systems can be connected to a DC grid with low losses in order to increase the efficiency and reliability of supply for production.

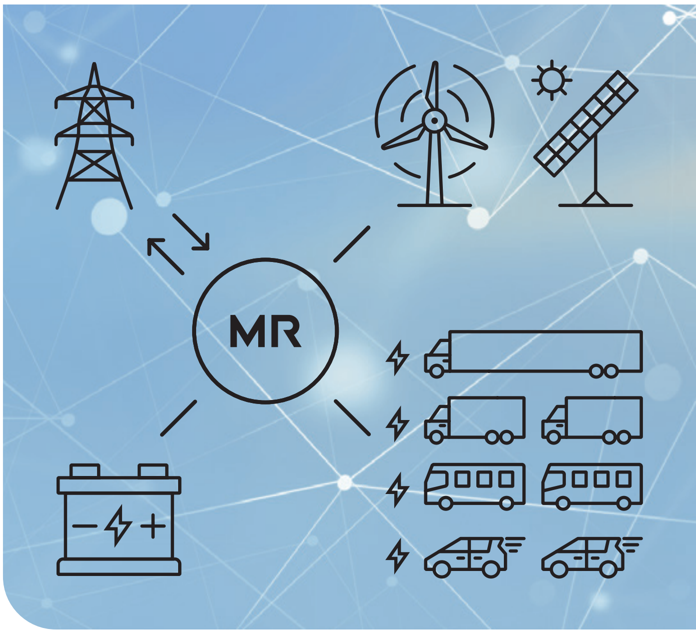
Benefits of industrial DC grids:

- Reliable power supply
- Higher energy efficiency
- Smaller and less expensive components

SMART RENEWABLE CHARGING.

DC-connected charging infrastructure

The rapid growth of electric vehicles requires scalable solutions for their charging infrastructure. Networking via a DC bus particularly offers advantages for charging large fleets such as buses or commercial vehicles in depots. A central DC voltage supply increases efficiency and enables the flexible integration of stationary energy storage systems. Cable routing is simplified, and the space required for charging points is reduced. In addition, all vehicles can be charged simultaneously and, using GRIDCON® DCT, energy can even be exchanged among the charging units with low losses, or fed back into the supply network.



Benefits of DC-connected charging infrastructure:

- Higher system efficiency
- Less space needed for charging points
- Vehicle-to-grid (V2G)

PHOTOVOLTAIC TO VEHICLE – PV2V.

Bringing together the energy and transport transitions

The higher the share of renewable energy in the power supply of charging stations, the more ecological benefits e-mobility has for the environment. However, feeding PV energy into the public grid is limited due to lacking grid expansion. As a result, the economic operation of PV systems is impaired. In contrast, selling locally generated PV energy directly to electric vehicle users (so-called PV2V) is attractive without requiring expensive grid expansion.

A particularly efficient and economical implementation of this PV2V approach results from direct DC coupling of PV generation (DC) with fast charging stations (DC) and buffer storage devices (DC) thus avoiding unnecessary conversion losses. The AC grid only supplies additionally required energy, and buffer storage avoids load peaks as well as the feed-in of excess PV energy.

Benefits of PV2V:

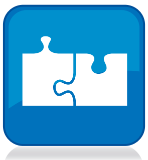
- High ecological benefit of e-mobility
- Economic investment in PV generation
- PV and charging infrastructure without grid expansion

MORE FUNCTIONS.
MORE POSSIBILITIES.
MORE FUTURE.

GRIDCON® DCT – Simplifies the transformation of AC grids into the world of DC

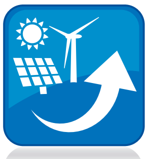
New pioneering technology with state-of-the-art functionalities

- Comparable characteristics to a conventional AC transformer
- Bidirectional load flow control and dynamically adjustable transformer ratio
- Galvanic isolation enables coupling of different DC network topologies
- Configurable short-circuit behavior enables completely new protection concepts



Scalable modularity – unlimited possibilities

- Modular 19" design for easy integration into a wide variety of system solutions
- Fully integrated, autonomous control enables parallelization and redundancy
- Ready-to-connect power unit for use as a charging station
- Scalable power even for large DC microgrids and megawatt truck charging



Gamechanger for the energy transition

- More flexible grid connection of renewable energies, energy storage and charging infrastructure
- Standardized grid component for the development of decentralized DC smart grids
- Standardized system components for the development of battery-buffered charging infrastructure
- Efficient PV2V solutions as an economic business model for self-consumption of PV generation

Universal hardware with customization via software

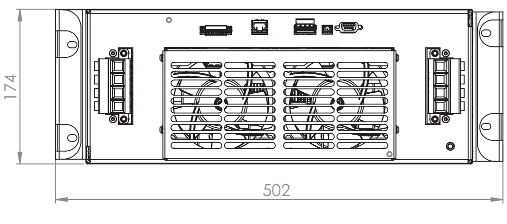
- The "Dual Active Bridge" topology with galvanic isolation allows maximum degrees of freedom for the control software
- The individual operating behavior is determined by software modules and initialization as well as parameterization that can be changed during operation
- The autonomous control reacts dynamically to current and voltage changes relative to fixed operating points or a characteristic behavior curve
- Easy integration into higher-level energy management systems, safe integration into protection concepts and direct control of pre-charging circuits

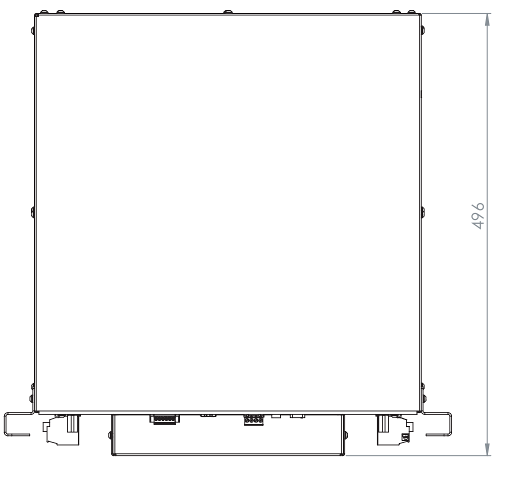
TECHNICAL DATA.

Technical data	GRIDCON® DCT75i
Rated input voltage	750 V / 1.500 V DC
Input voltage range	200 .. 920 / 1.500 V DC
Rated output voltage	750 V / 1.500 V DC
Output voltage range	200 .. 920 / 1.500 V DC
Rated input current	100 A parallel connection / 50 A series connection
Rated output current	100 A parallel connection / 50 A series connection
Nominal efficency	98,50 %
Interfaces	RS485 (1x) Ethernet – MODBUS / TCP (1x) DC in (4x 35 mm^2) DC out (4x 35 mm^2) DIGIN - 24 V (2x external release potential free) DIGOUT – 24 V (2x error signal potential free)
Auxiliary supply	24 V DC, +-10 %, max. 10 A
Operating temperature	0 .. 40°C
Storage temperature	-10 .. 55°C
Humidity	< 85 % relative humidity, non-condensing at 40°C ambient temperature
Atmosphere	nonflammable, non-corrosive and dust free
Weight	Ca. 50 kg
Dimensions	440 x 174 x 450 mm, 19“ modules
Cooling	Air (with internal, temperature-controlled fans)
Standards	EN 62477-1, EN 61851
Insulation coordination	Reinforced insulation Prim / Sec / Control 1000 V working insulation voltage

DIMENSIONS.

GRIDCON® DCT75i – 19“ Design





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IN8408083/00 EN – GRIDCON® DCT
F0403000 – 09/23 – dp

THE POWER BEHIND POWER.