TECHNOLOGY OFFER

SWITCHING VOLTAGE REGULATOR: METHOD AND DEVICE

The invention relates to a method for controlling a transformer powered by an inverter for the dynamic supply of an electrical load. The inverter is designed to convert a DC voltage into an AC voltage and includes controllable switching elements.

Since the 1970s, numerous patents have aimed to make such methods safe — a prerequisite for building blackout-proof DC power grids.

BACKGROUND, PROBLEM, SOLUTION:

Our modern world increasingly demands high-quality DC voltage — for processors in digital communication, artificial intelligence, and digital currencies, for dynamic drives and automated production, for lighting, and much more. It is estimated that over one-third of global electricity flows through systems involving this kind of configuration.

However, when DC voltage is switched to the transformer in either a positive or negative direction, it can suddenly become a short circuit if the magnetic flux exceeds the core's capacity. Numerous patents aim to regulate the power flow through the transformer using the inverter.

Current technologies are characterized by sluggish control, large intermediate energy storage, and added safety measures — because conventional inverters cannot respond quickly enough to load short-circuit events. As power levels increase, device complexity rises, and efficiency decreases. There is a clear need for a scalable solution.

This solution is a novel inverter control method that responds so quickly that the inverter becomes short-circuit resistant — like a forward converter.

ADVANTAGES:

- Power regulation via inverter becomes scalable (1 kW to GW+)
- Research phase completed
- Utilizes proven components
- Intrinsically short-circuit resistant (no additional components required)
- Enables process-optimized control
- Eliminates need for large energy storage
- Reduces physical size by over 50%
- Increases efficiency to up to 98%

REFERENCE:

H02M/2024

DEVELOPMENT STATUS:

TRL-2

APPLICATION FIELDS:

Power range from kW to multi-GW; chargers, isolating solar inverters; DC power supply for data processing, automation, dynamic drives, satellites, industrial applications; feeding DC grids and high-voltage direct current (HVDC) transmission systems; …

KEYWORDS:

- Inverter
- Transformer
- Transformer core saturation
- Switching voltage regulator
- Insulating direct voltage conversion

IPR:

Patentanmeldung A 50196/2024 und Internationale Anmeldung PCT/AT2025/060101

OPTIONS:

Co-ownership

Strategic partnership

Collaboration (via option agreement)

Full purchase

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