



STAATSMINISTERIUM
FÜR WISSENSCHAFT
KULTUR UND TOURISMUS



Freistaat
SACHSEN

Saksa Kevad 2023

Estonia and Saxony –
on the way forward to Clean Energy



1. About us



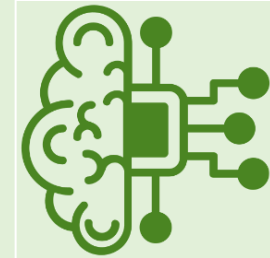
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Full member of the
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Power Electronics Group

Dept. of Electrical Power
Engineering and
Mechatronics,
School of Engineering,
Tallinn University of
Technology (TalTech)



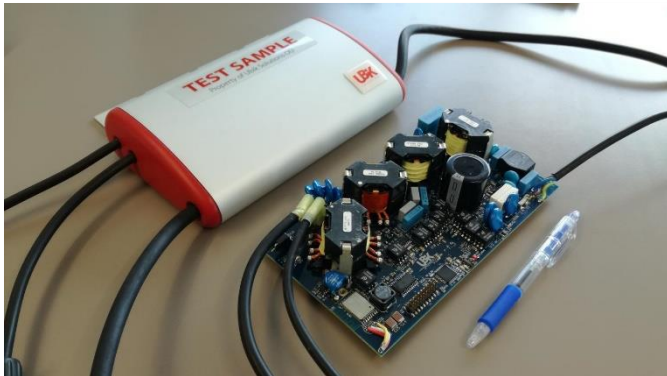
Applied power electronics

incl. design, development
and validation of advanced
power electronic systems
for renewable energy,
sustainable mobility and
energy-efficient homes

2. Renewable Energy Systems

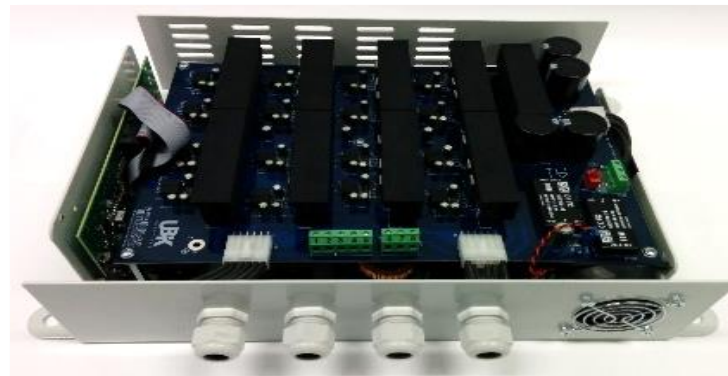
- TalTech PEG works on the cutting edge of the latest advances in the topic of high-performance photovoltaic (PV) converters, incl. string inverters and PV module-level power electronics. Interface converters for fuel-cells, batteries, supercaps, electrolyzers, etc.
- Over 10 Patents and Utility Models; US patent on advanced DC-DC converter and control is currently commercialized as OptiVerter® - first in the world hybrid of PV power optimizer and microinverter
- Joint product development with Estonian cleantech start-up companies Ubik Solutions, Sunly and MicroMasch Eesti OÜ

**OPTIVERTER® - Smart Grid Ready
Shade-Tolerant PV Microinverter**



- Input 8...60 VDC, output: 230 VAC, 50 Hz, 350 W
- Compatibility with different types of PV modules
- Global MPPT, ultimate shade-tolerant performance
- Wi-Fi based integrated communication gateway (IEEE 802.11 b/g/n)

**Smart Grid Ready "Full-SiC" PV String Inverter
with Ancillary Services Support**



- Input: 300...800 VDC, output: 400 VAC, 50 Hz, 3.5 kW
- "Full-SiC" design, switching frequency 100 kHz
- On-Grid and Off-Grid operating modes
- Enhanced power quality control algorithms
- Converterless integration possibility of battery storages

**Power Conditioning Unit for
Fuel Cell Back-Up Power Systems**



- Input: 35...64 VDC, output: 400 VAC, 50 Hz, 10 kW
- Modular design, interleaving control of cells
- On-Grid and Off-Grid operating modes
- Enhanced power quality control algorithms
- Converterless integration possibility of battery storages

3. Electromobility

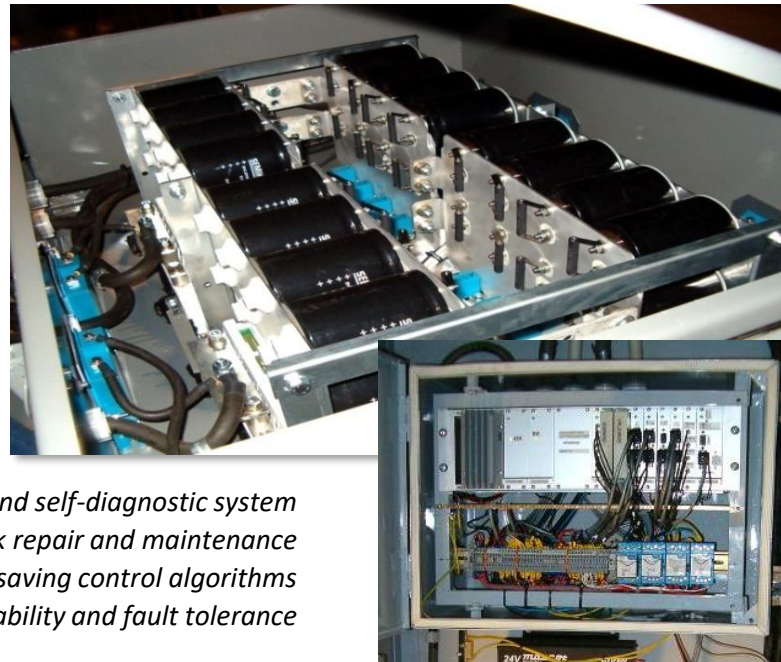
- Traction and auxiliary converters for light rail vehicles (trams), electric and diesel-electric locomotives and/or trains
- Fast and opportunity charging systems for electric vehicles (EV)
- Stationary battery energy storage systems
- Wide patent portfolio, joint product development with Estonian companies TET-ESTEL AS and MicroMasch Eesti OÜ

10 kW Rolling Stock Auxiliary Power Converter APC-10-1.5k

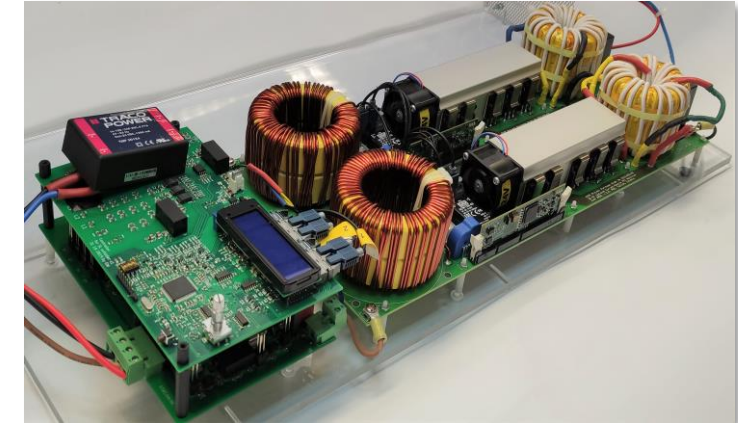


- Microprocessor control and self-diagnostic system
- Modular design for quick repair and maintenance
 - Energy saving control algorithms
 - Enhanced reliability and fault tolerance

160 kW Traction Converter TVM1 for Light Rail Vehicles



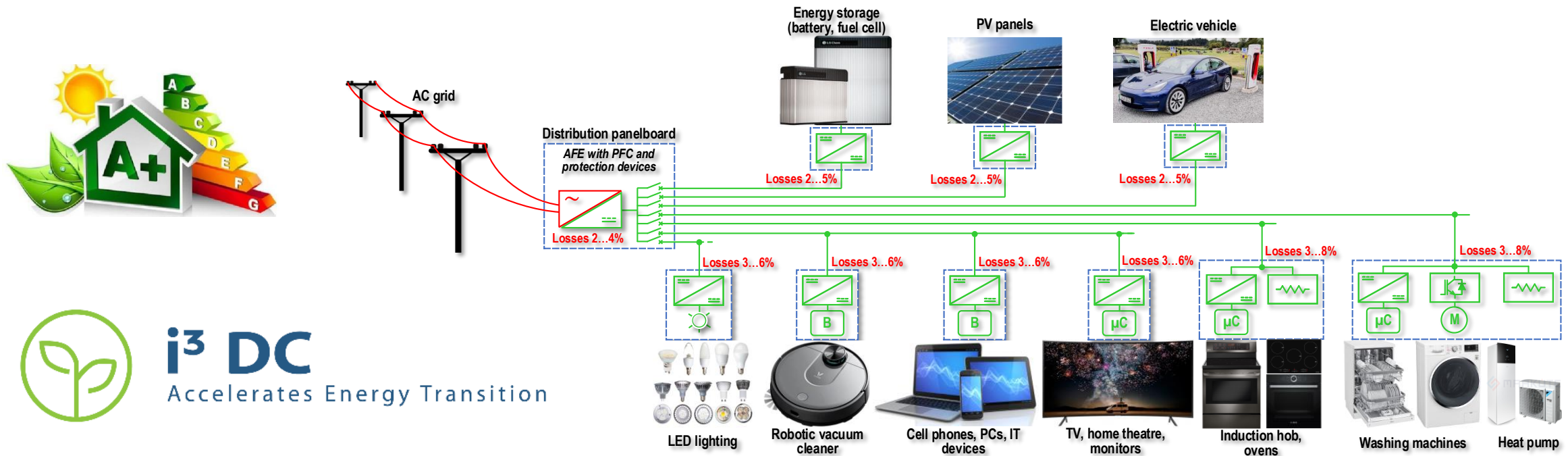
5 kW Electrolytic Capacitorless EV Battery Charger



- Input: 3x400 VAC, 50 Hz; output: 330...470 VDC
- Modular design with high-frequency isolation
- No grid filter and bulky DC-link capacitors
- Enhanced power quality control algorithms
- Simplified control with reduced number of sensors

4. Energy Efficient Homes

- Application of direct current (DC) power distribution concept for energy efficiency enhancement of buildings
- Highly reliable cost-optimal power electronic systems for DC integration of residential PV, battery energy storages and EVs
- Safe and secure control of residential DC microgrids, power trading between the building and utility grid
- Widening the awareness and acceleration of the industrial uptake of the residential DC microgrid technology (*i³DC* initiative)



5. What we are looking for

- *Joint submission of EU/national/regional funding applications*
- *Co-supervision of PhD students and postdocs*
- *Joint organization of matchmaking events for industrial companies and start-ups for dissemination of research findings and initiation of applied research and joint product development*
- *Joint organization of IEEE conferences and workshops*
- *Joint participation in the international working groups and other professional activities (i.e., preparation of international guidelines and transfer of good practices into other countries)*

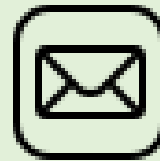
6. How to contact us



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