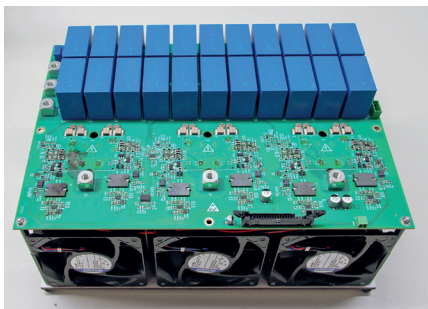


The Fraunhofer IEE in Kassel researches for the national and international transformation of energy systems. The Institute promotes the success of the energy transition business model by developing technical and economic solutions to reduce the costs of renewable energy, to secure the power supply and ensure grid stability at a high level.

### Converters and Drive Technology

The Department of Converters and Drive Technology develops converters for electrical grids and machines. We focus on renewable energy resources, ship applications and electric vehicles, including bidirectional wired and wireless charging. Additionally we develop new electrical machine concepts for wind power plants, for ship drives and industrial solutions. The power range can include anything from a few watts to several megawatts.



100 kVA SiC USV-inverter demonstrator

### Power Electronics and Components

Research topics in power electronics include the development and optimization of circuits and PCB-design for power

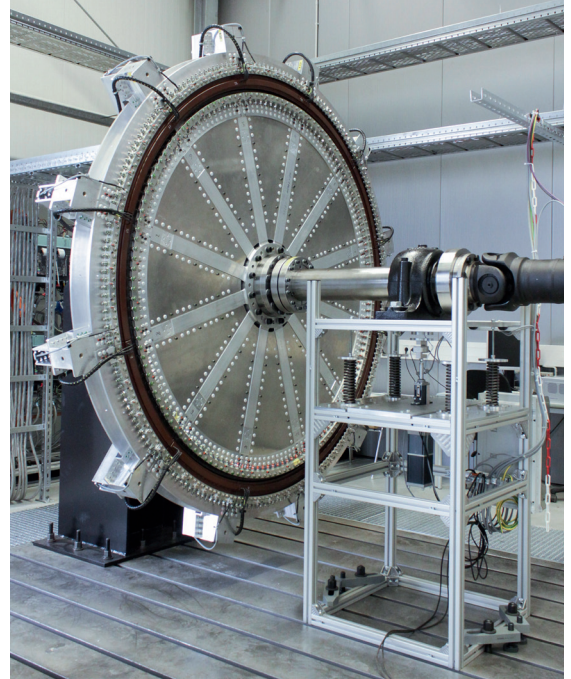
converters along with components for different applications. In addition to improving efficiency and reliability, we also focus on optimizing the volume-weight-cost ratio of power converters. Our development laboratories are well equipped for performing demonstrations, investigating components inclusive of characterizing and examining final products.

### Power Converter Control

This research focus concentrates on the design and optimization of control strategies and control algorithms to improve the behavior of power converters for on-grid and off-grid solutions. Hardware-in-the-loop and rapid-prototyping methods accelerate our development process and enhance the quality of our results. This allows us to implement our results professionally in DSPs and FPGAs.

### Electrical Machines and Drives

We specialize in the conception and electromagnetic design of ring generators and ring motors (including large drives, gearless, high-power applications and maritime drive technology). We provide solutions which prolong maintenance intervals as well as improving reliability and efficiency in partial load conditions.



Fraunhofer IEE ring generator in our test bench

### Testing

The testing of generation units, static converters and power electronics is an essential part of our research activities and services. In our accredited testing laboratories, we are able to carry out standard and customized tests as well as measurements and we are also able to characterize and simulate power electronics and system components, with particular focus on:

- Grid integration
- Performance and reliability
- Electromagnetic compatibility

We are continuously expanding the capability of our laboratories and carry out tests in the megawatt range.