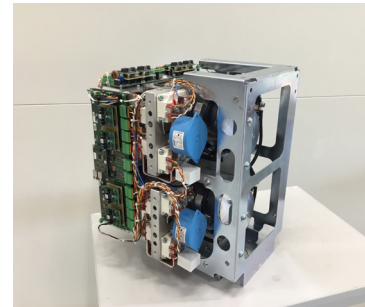


ISOLATED BUCK CONVERTER - DC SOURCE SINK



for power electronics, eMobility

Project requirements

The **aim of the project** was to develop and manufacture a bidirectional high-performance converter which also meets the requirements for charging and discharging vehicle batteries. Galvanic isolation was a basic requirement and was solved with an efficient resonant converter. The efficiency is between 92 and 95%, depending on the operating point. In order to meet the growing needs of increasingly powerful charging technologies, the converter, which can be operated in 2-quadrant mode, can be cascaded as often as required, allowing any desired output power to be achieved. For the current DC source sink, an output power of 500kW has been realized. For different test scenarios, the two buck converter bridges can be flexibly switched internally. Individual series and parallel circuits possible with individual modules for any output voltages and currents. With the current control time, jumps from 10% to 90% can be executed within one millisecond. The integration of the control unit is realized with CAN-BUS and EtherCAT. The manipulated variable can thereby be passed on to the microprocessor-controlled buck converter bridge from the outside.

Facts & Highlights

- Input voltage: 2x 650V DC, variable between 550V DC- 750V DC
- Continuous output power: 2x50kW per module, arbitrarily cascadable, currently realized for 500kW
- Limit output power: 2x75kw / 10 sec per module
- Individual series & parallel topology of the single modules for any output voltages and currents, e.g. V_{out} max. 1000V, I_{max} 160A
- Bidirectional, e.g. suitable for charging and discharging processes
- Interfaces: CAN-BUS, EtherCAT, RS232 Debug
- Coupling capacitance: primary & secondary shielded; not measurable
- High efficiency: efficiency rate between 92% and 95%
- Max. Isolation voltage: 2,6kV; Insulation class F, 155°C
- Coolant: air or water

Services by KNESTEL

Potential analysis, target price estimation, project management, functional specification, project planning, development software & hardware, electrical and mechanical design, EMC test, prototyping, series production

Possible Applications

Electromobility & Battery Simulation/Battery Emulation | DC Source Sink | Dynamic High-Voltage DC Source | Electronic DC Load | Power-to-Gas | Power Source for Electrolysis Plants | Test Benches for Electric Vehicle | Energy Source Emulation

About **KNESTEL**: For 40 years we have been developing and producing customized electronic and mechatronic special solutions in the fields of motor and machine control, frequency converters, image processing, MSR technology, software development, radio, bus systems and trace gas analysis.

We support our customers from the idea to the finished implementation. Individual solutions and concepts

- technically up to date. Our production - electronics production, device and switch cabinet construction, Production of subassemblies, assembly and mechanical processing - is equipped with the latest technology.