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Scalable insulated DC/DC converters for safe and efficient coupling of fuel cells, electrolyzers and DC grids

10 kW submodule

Test bench: 1 MWh LOHC storage system

DC/DC Converter

- **Universal building blocks**
  - **Building set with a large variety**
    - Voltage / Current / Power
    - Suitable topologies like Phase-Shift, Dual-Active-Bridge, Buck-Boost, ...
  - **Fully isolated design approach enables serial or parallel connection on both sides**
- **10 kW submodules**
  - **Realized by four universal building blocks**
- **30 kW electrolyzer DC/DC and fuel cell DC/DC**
  - **Each realized by three submodules**
  - **Over 10 kW output power the minimum efficiency is higher than 94 % due to phase shedding ability**

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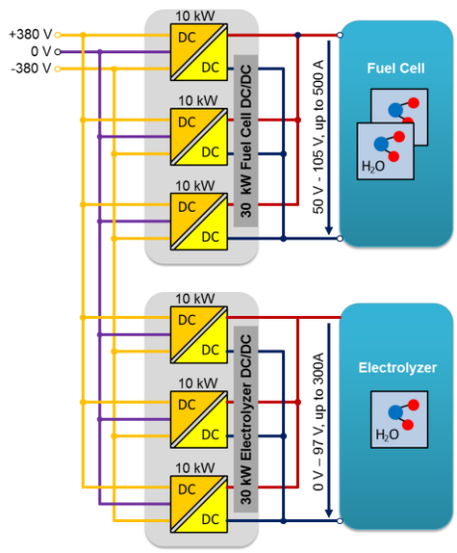
Technical Data

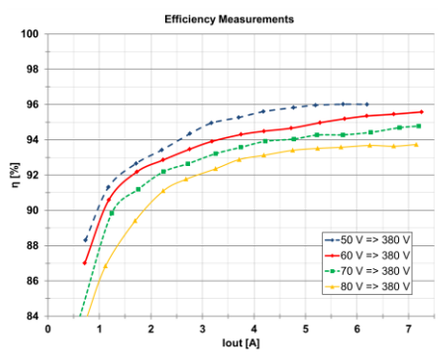
Converter	FC	EL
Low Side Voltage	50 V ... 105 V	0 V ... 97 V
High Side Voltage	380 V ± 10 %	
Max Output Current	500 A	300 A
Max Output Power	30 kW	30 kW
Max Efficiency	96.0 %	96.6 %
Max Coolant Temperature	65 °C	
Max Air Temperature	45 °C	
Switching Frequency	47 kHz	
Dimension Rack	19" x 6U (267 mm) x 650 mm	
Power Density Rack	1.15 kW / dm³	
Power Density Power Electronic	3 kW / dm³	

Realized Application



Efficiency Measurements

Building block (phase) of the fuel cell DC/DC converter



Building block (phase) of the electrolyzer DC/DC converter