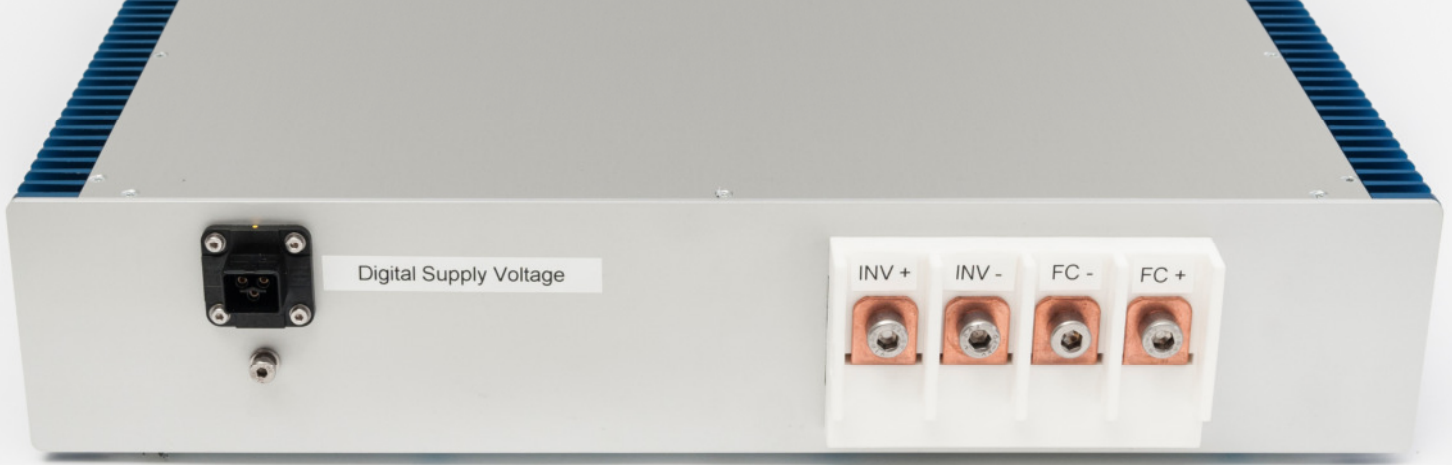


High Efficient 300 A Fuel Cell Booster

for stationary applications





Galvanically coupled extreme high conversion ratio Boost Converter

Description

Fuel Cells are considered as one of the most promising future power sources. However, they have a high current and low voltage output that demands power conversion for most applications. Fraunhofer IISB has developed a DC/DC-converter which is specially tailored to these requirements.

This Fuel Cell Boost Converter is packed in a compact 19 inch 2U housing, has an input voltage range of 25 V to 100 V and supports output voltages up to 850 V. The sides of the housing act as heatsinks and have internal heatpipes, allowing passive cooling for lower load points. For high load conditions with input currents up to 300 A the optional water cooling ensures reliable operation.

Despite its extreme conversion ratio it features a transformerless design, leading to a higher efficiency and power density. This design is enabled by the use of SiC MOSFET power modules and optional operation in boundary conduction mode with valley switching.

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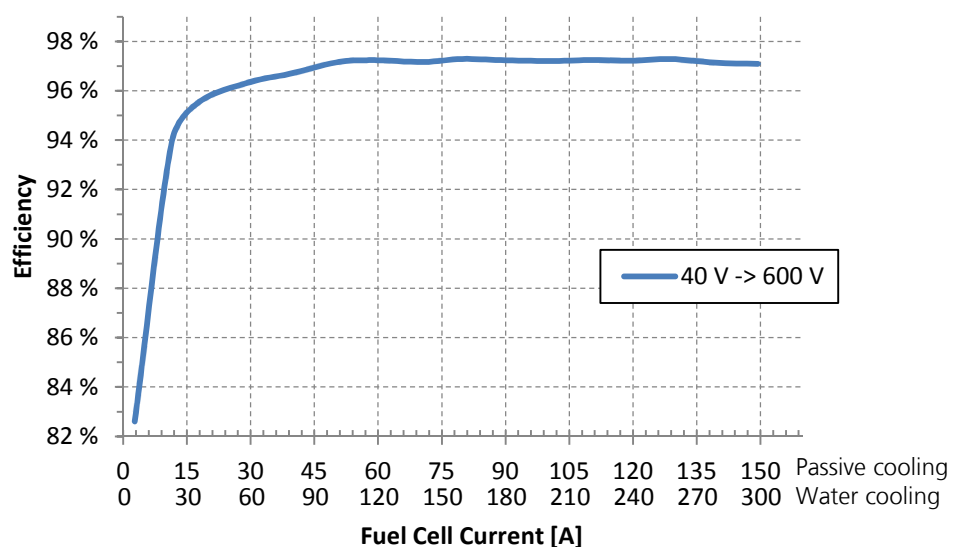
Technical Data

Fuel Cell Voltage Range V_{LV}	25 to 100 V
Highside Voltage Range V_{HV}	400 to 850 V
Lowside Current	300 A
Fuel Cell	up to 20 kW
Auxiliary Supply Voltage	9 to 36 V
Hybrid Cooling System	Combinde passive air and liquid cooling
Switching frequency	up to 80 kHz
Dimension	2 Unit 19" Rack
Power terminals	4 x M8
Weight	25 kg
Size	48,5 x 60 x 9 cm ³
Efficiency	Average > 97 %

Features

- Optimized for extreme conversion ratio
- SiC MOSFET power modules with SiC diodes
- Valley switching for higher efficiency
- Fully digital controlled via CAN-Bus
- Programmable control loop parameters
- Temperature derating
- Over current / voltage protection
- Interlock pin
- Internal electric contactor
- Passive precharge of capacitors with PTC
- Wide input and output voltage range
- Passive cooling with optional water cooling
- Wide coolant temperature range

Efficiency Data



Test Setup: DC/DC Converter is connected between Fuel Cell and a high voltage Load, e.g. a three phase inverter. The output voltage is constant 600 V while lowside voltage is set to 40 V.