Stercom Power Solutions GmbH

The energy storage experts

About us

- Founded in 2014 by a group of experts in Energy Storage Technologies, Power Electronics and Software Applications
- Currently 20 employees with vast experience and background in research, development and systems technology
- Fit for challenging problem solving in the industrial, the automotive and railway ESS sector
- Production with highly qualified local partners
- Innovation network for turn key and interdisciplinary solutions in various engineering fields, well beyond electronic development

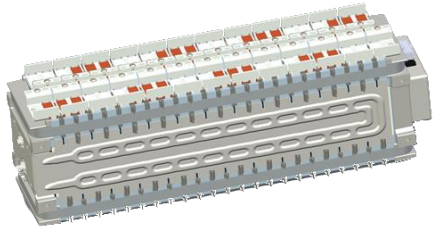
Turn Key Services

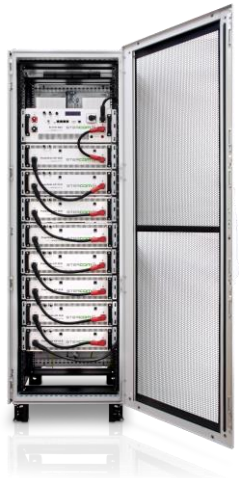
- ✓ Storage technologies
- ✓ Power electronics
- ✓ Special environmental- and system requirements
- ✓ Design to Cost
- ✓ Safety and qualification
- ✓ Customer orientation & after sales support
- ✓ System engineering
- ✓ Certification: ISO 9001

- ✓ Simulation and modelling
  +electrical
  +mechanical
  +magnetic
  +thermal
- ✓ Mechatronic Integrated Design
- ✓ Life Cycle Simulation Field Data
- ✓ Process Control/ SIL Safety Software
- ✓ CE, ECE, ICE, UL, Mil, Transportation
- ✓ HV system engineering and optimization
- ✓ Remote Support, After Sales Team, Remote Training

Product portfolio

- ✓ OnBoard Charger
- ✓ High performance SuperCap systems
- ✓ High performance Battery systems
- ✓ Hybrid SuperCap battery storage
- ✓ SuperCap- and Battery cell management (industrial & e-Mobility)
- ✓ (Fast-) Charger and “Active Power Booster”
- ✓ Network Stability and Peak Shaving
- ✓ Inductive charging





Off-the-shelf or customized?

We can design an individually suited concept, depending on complexity, environment, security requirements and quantity!

For this purpose we apply standardized components or develop new ones with our network partners for an optimal and individual solution!

Onboard Charger 22kW

- ✓ Ultra compact 22 kW OnBoard Charger
  - 450V/70A
  - 800V/40A
- ✓ Compatible with all kinds of standard AC wall boxes
- ✓ Optimized Charging procedure for all types of battery technologies
- ✓ Very high efficiency (>98 %)
- ✓ Fluid cooling with wide range of water inlet temperature
- ✓ Remote maintenance via Stercom Diagnostic Studio

Optional:

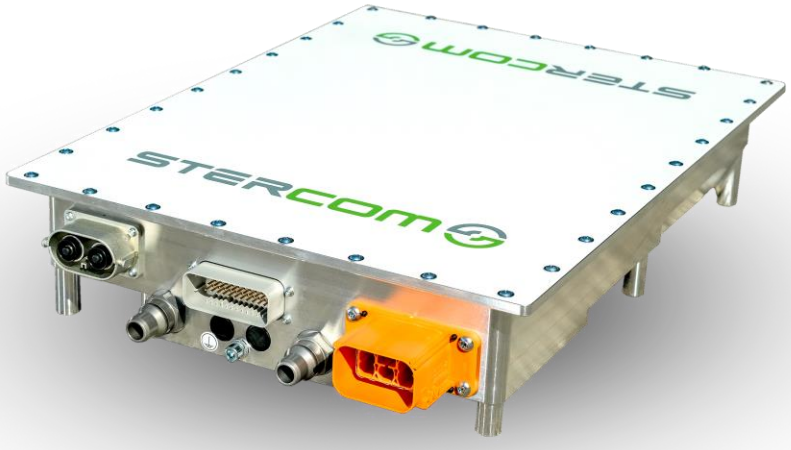
- PowerLine Communication for DC Charging mode
- Integrated Stercom Battery- and Cell –Management
- Extern Energy- and Inlet-Management

Features

- Type2 / CSS2 Inlet handling
- Galvanic isolation
- AC Power Factor >99 %
- CAN 2.0 or SAE J 1939

Application

- AC Power e-Charging
- E-Trucks
- E-Busses
- Industrial vehicles

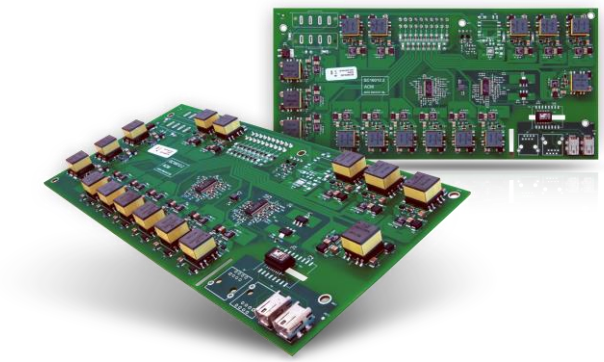


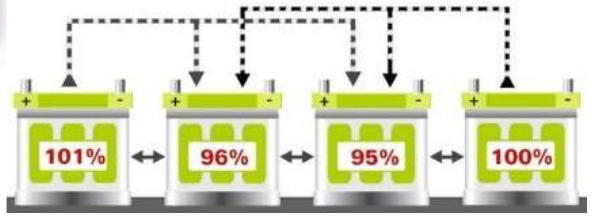
Mobile BMS (mBMS)

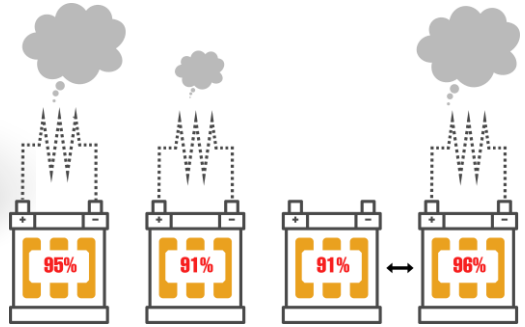
- ✓ Precise cell monitoring and management
- ✓ AutoConfig features to automatically detect number of modules/number of strings
- ✓ Integrated pre-charge function
- ✓ Independent max. balancing to protect the cell from over-charging
- ✓ Isolated temperature measurements on the board
- ✓ CANopen 2.0B /SAE J 1939 or ModBus TCP/ IP System Interface
- ✓ Remote Monitoring
- ✓ Very Low Self Consumption in Sleep Mode
- ✓ CCS DC Charging Capability via EPLC
- ✓ Prepared for DIN ISO 26262 Functional Safety Level ASiL B and DIN 61508 SIL2

Technical Data	
Cells per board/module	5-12
Max. voltage (board)	55 V
Min. voltage (board)	5 V
Balancing Current	0,45 A
Isolation test voltage	4000 VAC
Max. QTY (boards) per string	32
Temparature Sensors	4 outboard NTC + 1 onboard NTC
Cell voltage	0 bis 5 V
Resolution of the cell voltage	0,1 mV
standby consumption	< 35 µA

Cell Balancing and Battery Management







ACT (Active Charge Transfer) Balancing

- Active charge transfer moves charge from one cell to the module
- High balancing currents of up to 5 Apeak, max. 3 Arms
- Charge transfer efficiency up to 92%
- Support of the weakest cell in the stack allows DoDs up to 100 % of total battery capacity
- Very low standby losses
- Ideal for bigger LiION Cells, configurable for all cell technologies up to 4.2 V cell voltage

DCB (Dynamic Cell Balancing)

- Dynamic Cell Balancing allows for adjustment of deviating cells even with low SoC
- Typical balancing currents 0.45 A @ 2,7 V cell voltage
- Suitable for all cell technologies up to 5 V cell voltage
- Cell monitoring from 0.3 V is suitable for UltraCaps

Battery Storage Systems

TV 19“ Slide–in System

- Battery stacks in 19“ slide-in-system, up to 13 modules per string
- Battery clusters by parallel connection of many strings
- AutoConfig for automatic configuration of low volt or high volt systems
- Passive connection to charger via String Management Unit
- Active connection via String Power Booster

Battery- and Cell-Management

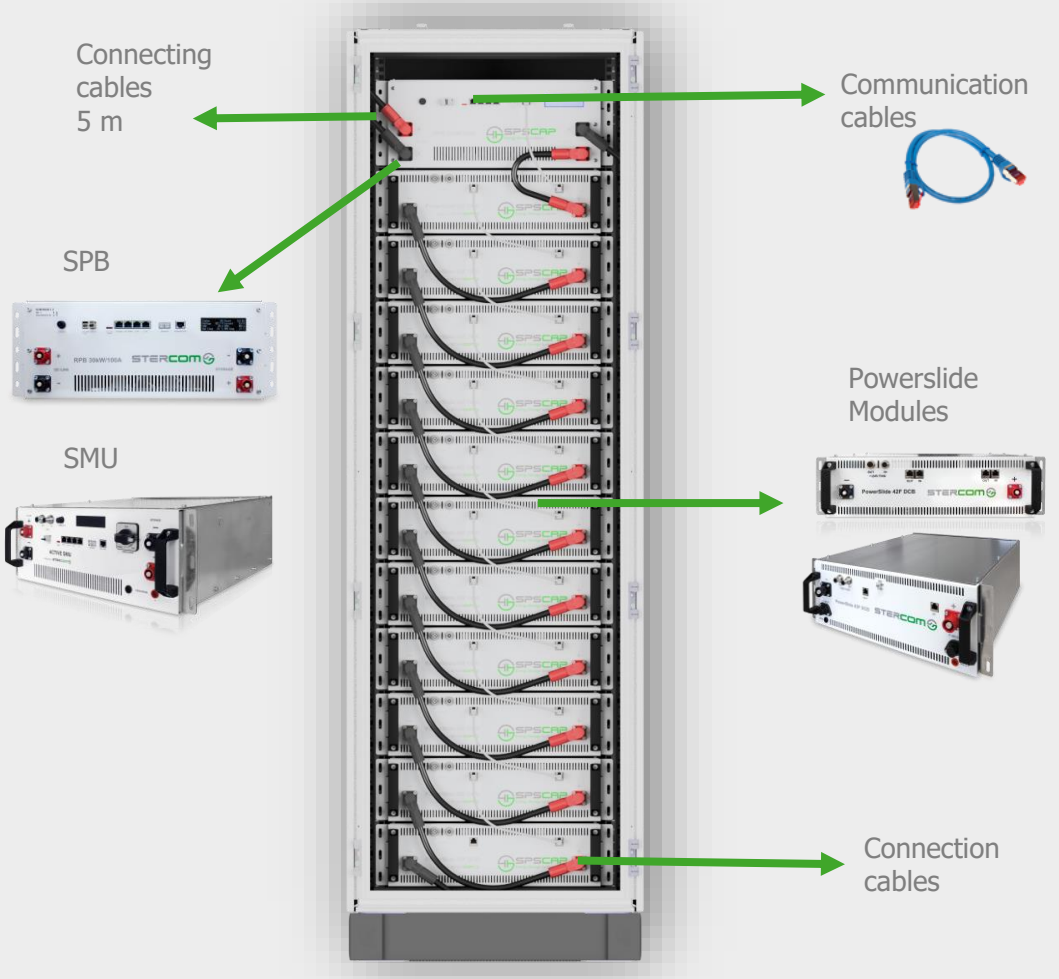
- Isolated CellCom bus for up to 30 DCB18 per string
- Supply voltage range 18 – 75 V
- Optional current measurement for detection of state of charge (SoC) and state of health (SoH)
- Grouping of several strings for huge battery clusters via CAN Cluster Bus
- Communication link to the charger or energy management via
  - MODBus TCP/IP
  - Ethernet, MQTT
  - CAN
- Configuration of PowerSlide modules/system via „Stercom Diagnostic Studio“
- Address selection switch for cluster applications with several strings

PowerSlide 19“

- ✓ Variable configurable storage system for energy efficiency and safety
- ✓ Configurable stack voltages and power, AutoConfig Mode
- ✓ Active connection to a DC-link with the “String Power Booster” (SPB)
- ✓ Passive connection to a charger with the “String Management Unit” (SMU)
- ✓ Dynamic cell balancing and cell monitoring with DCB18
- ✓ Up to 13 modules per string,
  up to 1.500V stack voltages
- ✓ Available Versions:

- 42F/96V DCB
- 83F/96V DCB
- 42F/102V DCB
- 83F/102V DCB

- 42F/96V SMC
- 83F/96V SMC
- 42F/102V SMC
- 83F/102V SMC



UltraCap-Modules and -storage systems

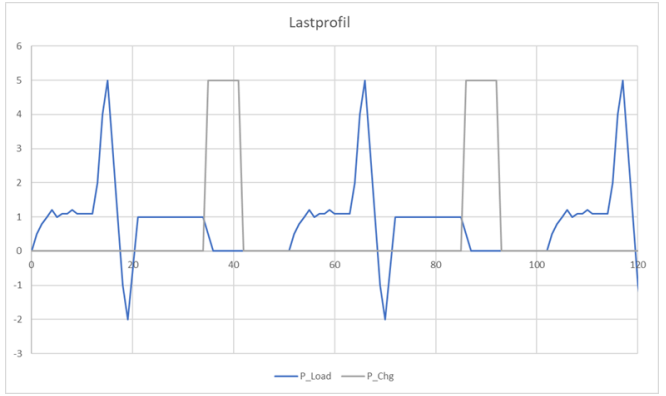
- Standardized or individual UltraCap-Modules for stationary and mobile applications
- PowerSlide concept with AutoConfig Mode
- Performance profiles and performance simulations
- Customer-specific cell constructions
- Integrated intelligent cell-monitoring and balancing
- Temperature-monitoring
- Isolated CellCom interface to the CMC
- Special cases

PowerSlide 42F_DCB

Standard- und Custom Modul

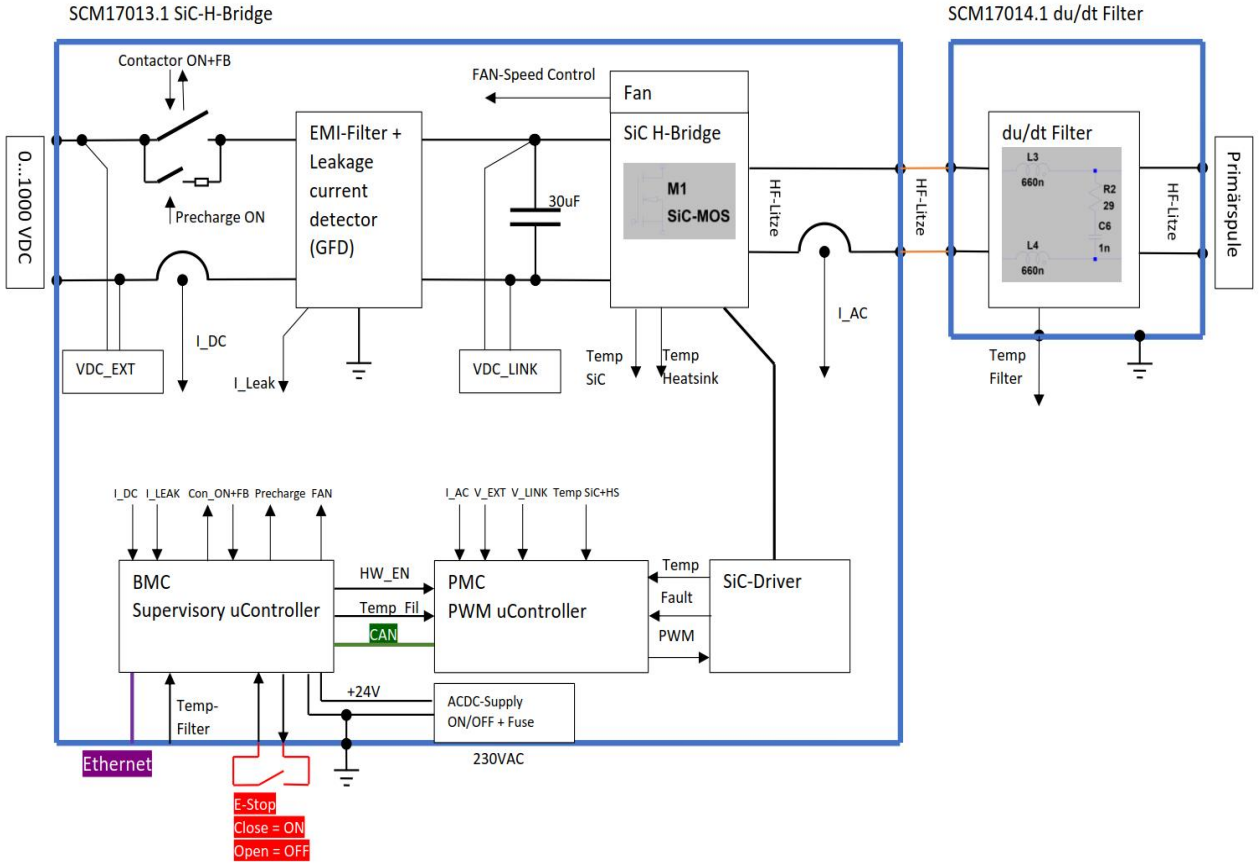
High-capacity modul 1000F/31V/6000A

PowerSlide 83F_DCB



FTS Modul 150F 55V

Inductive Charging Inverter 22 kW (ICI [ˋizi])



- DCAC Inverter to feed stationary primary cools inductive e-vehicle charging
- 22kW induced power
- Overall efficiency up to 93% depending on air gaps
- AC-output current up to 70 Arms at cos phi = 0
- DC Input voltage range 0…800 V (max. 1.000 V)
- Adjustable transmitting frequency from 60 kHz to 100 kHz
- Adjustable Duty -Cycle from 0 to 100%

Applications

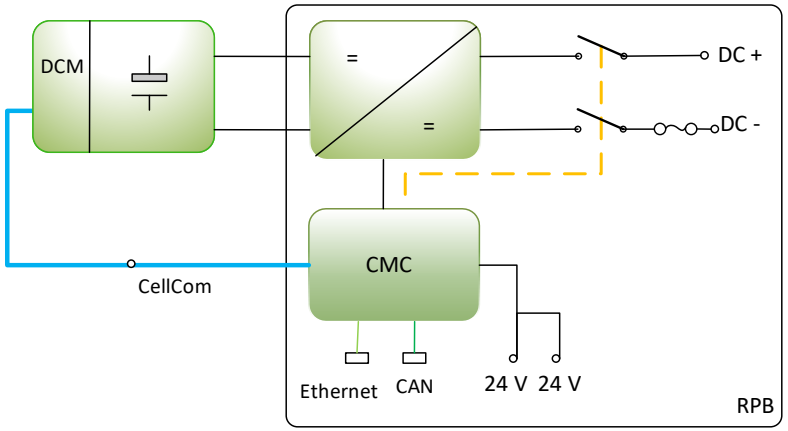
- Control of stationary inductive charging coils for e-vehicles
- Testing system for any type of inductive elements like coils transformers etc

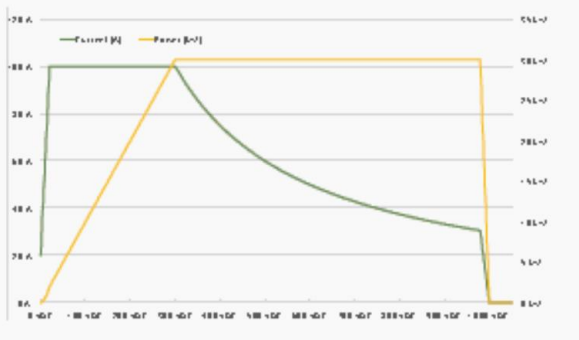
Aktive Connection
with String Power Booster (SPB)

- 30 kW DC/DC Converter and String Management Controller
- Bidirectional operation (no galvanic insulation)
- Charging and discharging controlled via operation modes
- Plus-Minus disconnection by two contactors
- Voltage range - UltraCap 0…800 V (max. 900 V), max. 100 A
- Voltage range - DC-Link 0…800 V (max. 900 V), max. 50 A
- Interfaces to external control units (CAN, ModBus TCP/IP, Ethernet)
- Forced cooling via temperature dependent control
- Fault current monitoring
- DC Link precharge function
- Voltage UltraCap < DC-Link

Options:

- Energy management for different energy profiles
- (Loadshaving, Peakshaving, USV)
- Internal power supply (supplied from DC-Link or UltraCap)
- SPB without integrated SMC
- Overlapping voltage ranges (full range buck – boost)

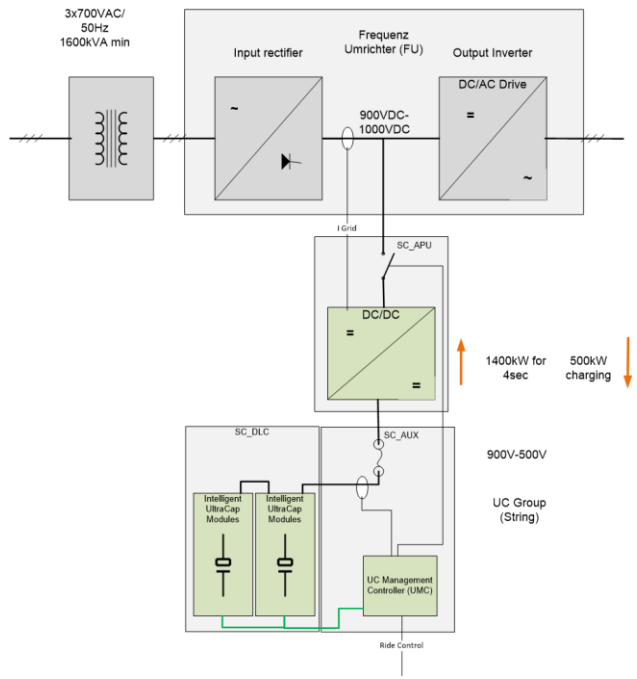




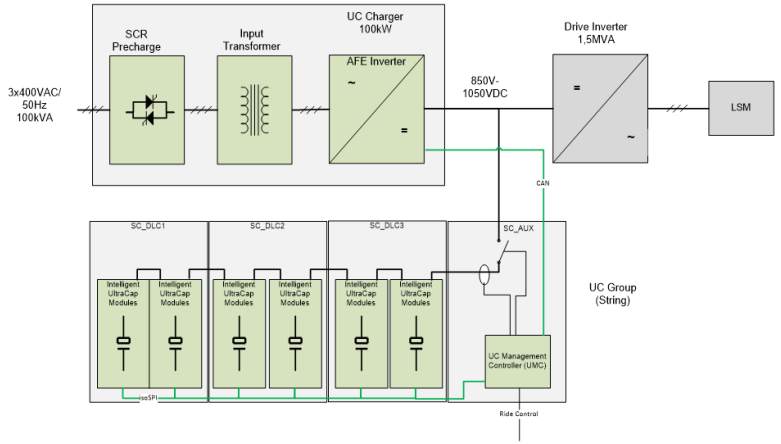
PowerStore: UltraCap Power Booster

passive oder aktive for very high power

- DC-Link connection of the UC storage via “active Power Booster”
- peak shaving function -> thereby variable limitation of network performance
- Alternative passive connection to the DC-link with special AFE loader with pre-charge unit
- Max. drive power so far 8MW
- Max. energy content so far 13MJ/3kWh
- Typical load time up to 10 sec, typical time of a cycle 60sec
- Simple connection by control via droop mode
- Intelligent, adaptive high performance-UltraCap modules
- Stack voltages up to 1.000V
- Remote monitoring
- Efficiency of the cycles 92%
- Low-maintenance, self test features
- Up to 1.2 Mio. cycles, depending on construction



Active Booster with Peaksharing

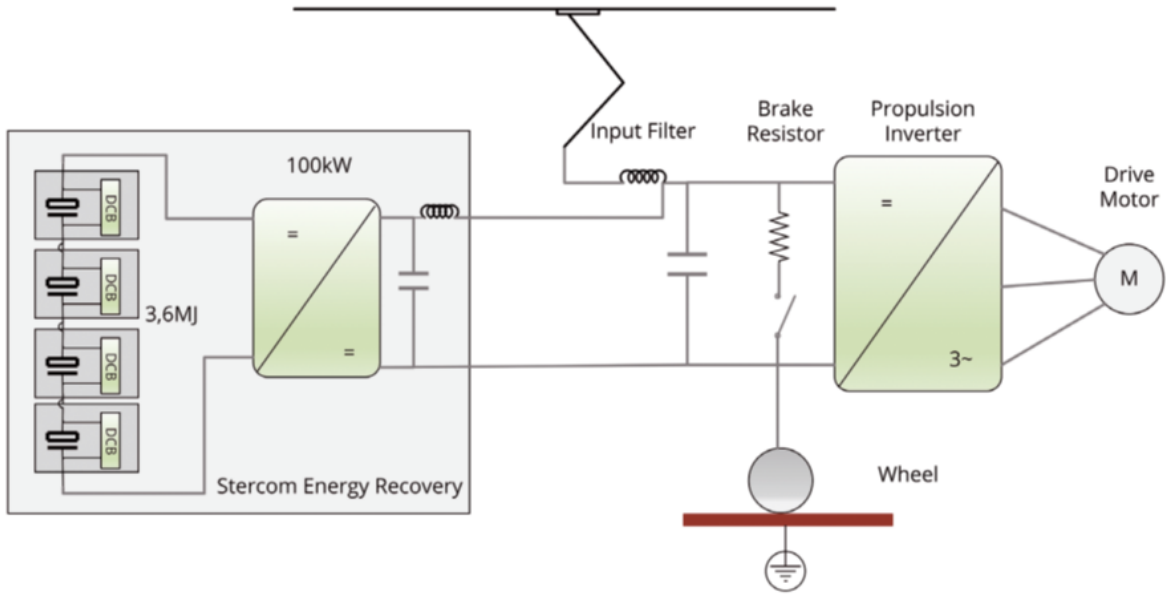


Passive DC-link Booster

Aktive „Energy Recovery“ using Ultacaps or Batteries

Applications

- Active Braking Resistor
- Energy Recovery at Diesel Electric Systems
- Energy Recovery at hybrid-full-electrical systems
- Power Boost with Fuel Cell Drives



- Active recuperation of braking energy using UltraCaps or High Power Batteries
- Typical Load Power < 200 kW
- Typical energy content 1 - 3,6 MJ / 0,3 - 1 kWh
- Typical load time up to 20 sec, typical cycle time 60 sec
- Simple and quick adaption to any DC Link using Voltage Droop mode regulation
- DC-Link voltages up to 1.500 V
- Remote Monitoring, Self-Test Features
- Full cycle efficiency up to 96%
- IP65+, maintenance free, very high operation cycles

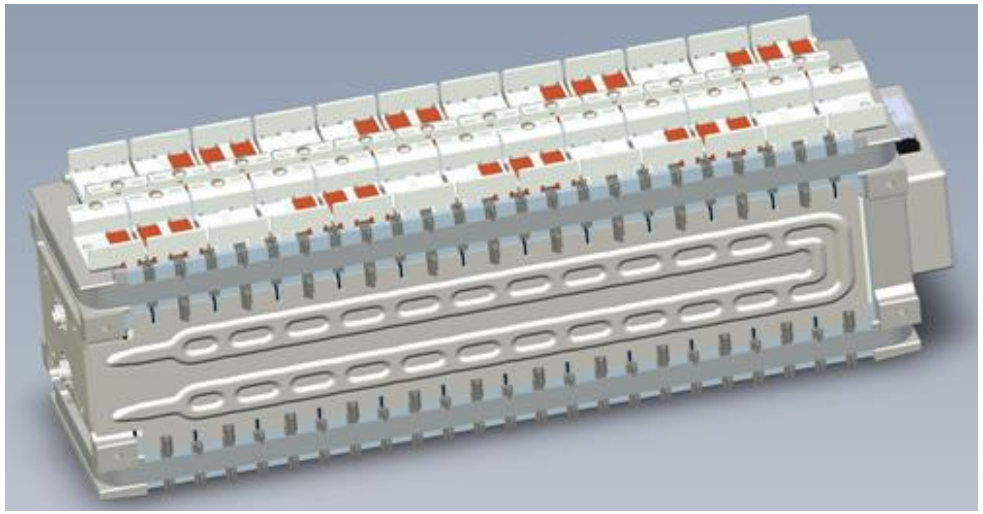
LTO High Power Battery Module

Scalable. Validated. Durable

- High energy and power density
- Optimized Liquid cooling for even temperature distribution
- Compact and lightweigt solution, significant volume reduction due to liquid cooling
- Long service life to active and thermal management
- Active cell balancing

Certified according to automotive standards

- Suitable for multi-string systems with monitoring on single-string and full systems level
- Development compliance ISO 6469-1, ISO 6469-3, ISO 26262
- Safety compliance IEC 62619, UN ECE R100
- Transportation UN 38.3
- Protection class IP67
- SOC/ SOH analysis
- Single cell voltage monitoring and balancing

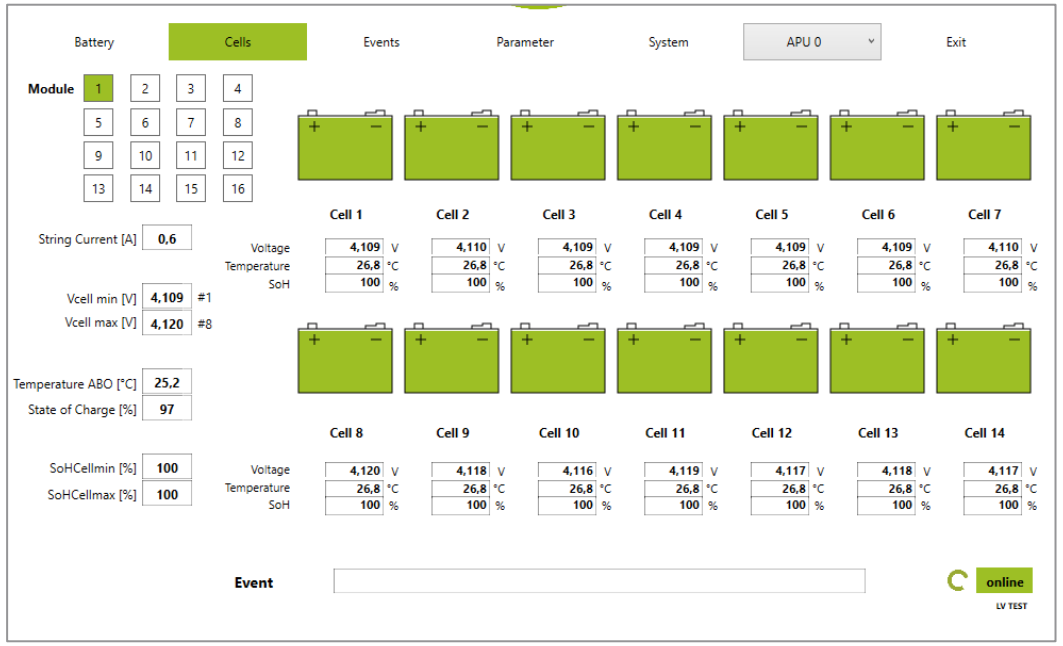


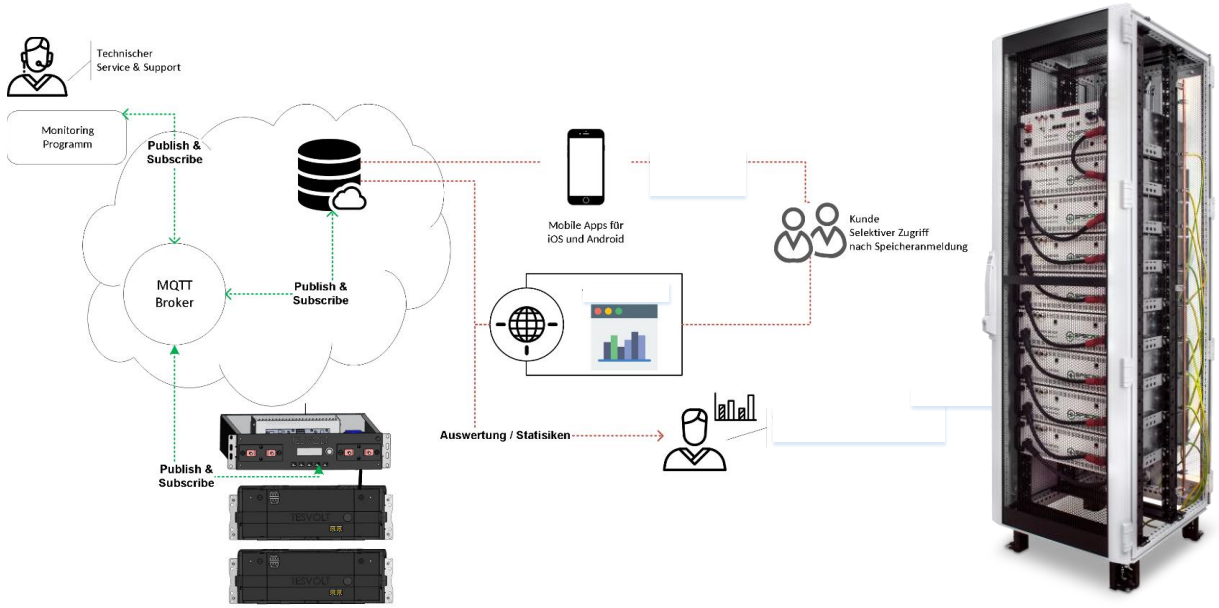
Stercom Diagnostic Studio

- ✓ Visualizing of Cluster, String, Modul and Cell-Status
- ✓ Event- and Error Buffer for easy Trouble Shooting
- ✓ Remote Parameter Settings
- ✓ Firmware Updates
- ✓ Easy to use

Stercom „Diagnostic Studio“ Portal

- ✓ Service and Maintenance Portal for external access
- ✓ Remote Maintenance via Internet
- ✓ Fleet Management Functions

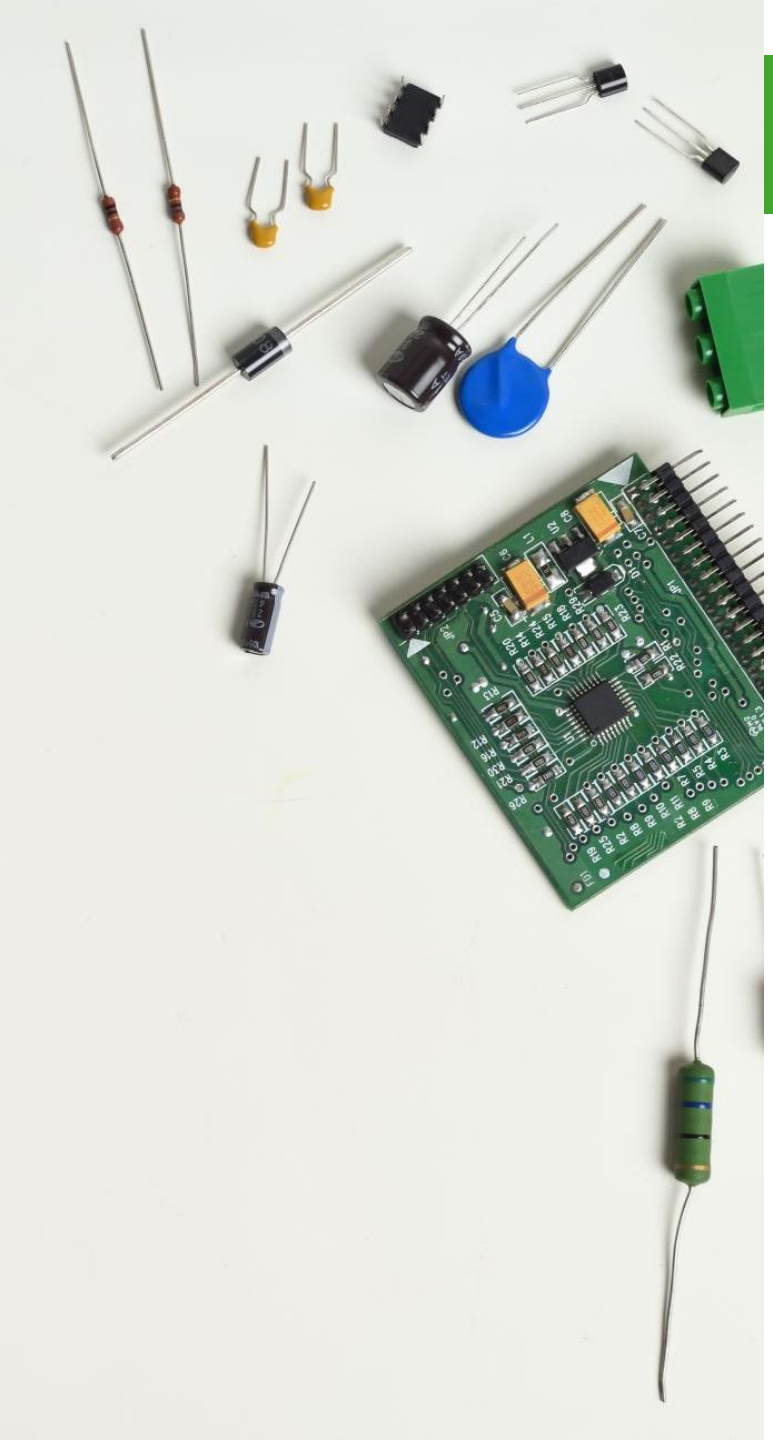




Applications

Einstein Elevator
Parabolic Flight System

- Research facility of the Hannover Institute of Technology (HITec)
- Objective: Investigation of various substances under weightlessness
  or adjustable gravity
- Arabolic flight of an experimental capsule allows almost complete
  weightlessness for 4 seconds
- Up to 100 flights a day
- Technology: linear drive technology, vacuum-sealed capsule,
  quickly rechargeable high-performance storage system (Stercom)



Innovation-network

SPSCap Europe GmbH:
UltraCaps, Standardmodule and more
www.spscap.de

Stersoft Software Solutions GmbH
Embedded Software, industrial Fieldbusses, Software, Process-visualizing, Functional Safety
www.stersoft.de

AURUM Engineering:
Embedded Software, industrial Fildbusses, SIL Software, Process-visualizing
www.aurum-engineering.de

TESVOLT GmbH:
Batteries, Energy Storage Systems
www.tesvolt.com

Design & Concept, Development, System Engineering, Power Electronics, Simulation, Qualification & Certification

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