



Maximum Safety	Most Reliable Quality	High Availability	Modular System
<ul style="list-style-type: none"> Functionally safe and long-life EV-batteries (according to IEC 62619 and TS 16849) Compliance with the criteria of Performance Level (PL) D Integrated exhaust system for maximum fire protection Extensive insulation monitoring 	<ul style="list-style-type: none"> Converter are designed for a lifetime of > 20 years Use of high-quality components from well-known European manufacturers Quality „Made in Germany“ 	<ul style="list-style-type: none"> Highly redundant Battery Management System Battery modules can be disconnected individually Worldwide and long-term availability of spare parts 	<ul style="list-style-type: none"> Hybrid-Converter-Concept enables integration of additional energy sources / consumers Uninterruptible Power Supply (UPS) Black Start Capability Flexible and easy customization

FREQCON Converter System with Mercedes-Benz Energy Battery Storage

Safest system on the market

Together with our converters, we offer Mercedes-Benz Energy batteries as a complete BESS solution.

Mercedes-Benz Energy contributes to the overall system a 1.4 MWh container with 2nd-life EV batteries including Battery Management System (BMS). FREQCON integrates its converter which is specifically customized for the car batteries and combines both into a scalable turnkey storage system with a wide range of applications.

We have a strong focus on research and development. The top priority is the principle of developing state-of-the-art technologies according to the highest quality standards. This concept complements perfectly with the high safety and availability requirements of the Mercedes-Benz Energy Battery Storage.

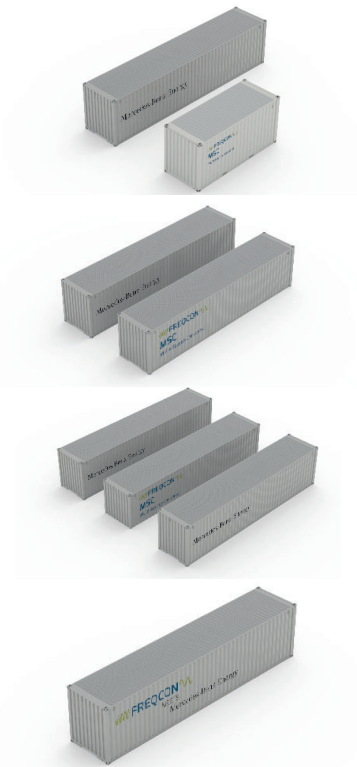
With this solution, FREQCON offers the best price-performance ratio based on highest safety standards.

ALL-IN-ONE SOLUTION

Variants



Converter nominal power	0.5 MW	0.7 MW	1 MW	1.5 MW
Container converter	1 x 20 ft			
Energy content battery storage	1.4 MWh			
Container battery storage	1 x 40 ft			
Converter nominal power	2 MW		3 MW	
Container converter	1 x 40 ft			
Energy content battery storage	1.4 MWh			
Container battery storage	1 x 40 ft			
Converter nominal power	4 MW	5 MW	6 MW	
Container converter	1 x 40 ft			
Energy content battery storage	2.8 MWh			
Container battery storage	2 x 40 ft			
Converter nominal power	0.5 MW	0.7 MW	1 MW	
Energy content battery storage	1 MWh			
Container converter with integrated battery storage	1 x 40 ft			

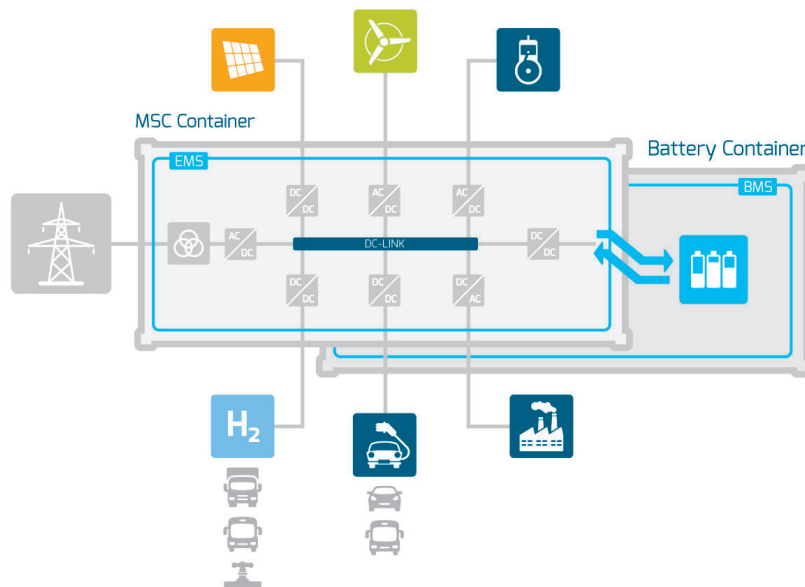


APPLICATIONS

Our Grid & Storage Solutions allow an efficient and reliable use for various applications:

- Peak shaving
- Peak shifting
- Uninterruptible power supply (UPS)
- Active harmonic filter
- Hybrid applications
- Energy arbitrage / Daytrading
- Grid services
- Black start capability
- Island grid operation
- Dynamic voltage control
- Reactive power compensation
- Voltage dip mitigation
- Primary control reserve (PCR) / Frequency containment reserve (FCR)
- Frequency control
- Grid forming
- Synthetic inertia

SYSTEM DIAGRAM



System diagram for FREQCON BESS EV

Technical Data	FREQCONBESS EV combined with our converter								
	MSC 500	MSC 700	MSC 1000	MSC 1500	MSC 2000	MSC 3000	MSC 4000	MSC 5000	MSC 6000
Nominal AC voltage	400 V								
Nominal apparent power	500 kVA	700 kVA	1000 kVA	1500 kVA	2000 kVA	3000 kVA	4000 kVA	5000 kVA	6000 kVA
Nominal current	723 A	1012 A	1445 A	2167 A	2890 A	4336 A	5780 A	7217 A	8670 A
Power factor at rated power / adjustable	1 / 0.0 overexcited ... 0.0 underexcited								
AC power frequency (range)	50 Hz (47 Hz ... 53 Hz) / 60 Hz (57 Hz ... 63 Hz)								
IGBT switching frequency	2 ... 4 kHz								
DC link voltage	800 VDC								
Number of DC outputs	8						16		
DC voltage range	320 VDC ... 420 VDC								
DC current per output	196 ADC	274 ADC	391 ADC	586 ADC	781 ADC	1172 ADC	781 ADC	977 ADC	1172 ADC
DC current combined outputs	1568 ADC	2192 ADC	3128 ADC	4688 ADC	6248 ADC	9376 ADC	12496 ADC	15624 ADC	18752 ADC
Main controller	Siemens Simotion P320-4								
Battery	PB300-14, Lithium-Ion batteries								
Manufacturer of the battery	Mercedes-Benz Energy (MBE)								
Battery capacity (nominal)	37.8 Ah								
Battery energy content (nominal)	13.8 kWh								
Battery nominal voltage / min./max.	365 VDC / 320 VDC / 420 VDC								
Number of batteries in MBE container 40 ft	112								
Number of strings	8						16		
Battery arrangement	14 Batteries in parallel per DC string								
MBE 40 ft battery container energy content	1545 kWh								
MBE 40 ft battery container energy content usable	1400 kWh								
Temperature range (storage)	-20 °C ... +35 °C								
Operating temperature (ambient)	-20 °C ... +40 °C								
Maximum ripple current	<5% of nominal current								
Battery Management System (BMS)	Mercedes-Benz Energy BMS								
Standards and Certifications	Low Voltage Directive (NSRL) DIN EN 62109-1 and DIN EN 62109-2 EMV-Directive DIN EN 61000-4-2 and DIN EN 61000-6-4								
Internal communication	Profinet IRT								
External communication interfaces	Ethernet, RS485, RS232, MODBUS TCP, Profibus, Profinet								
Protection class (MBE/FREQCON container)	IP56 / IP54								
Max. THD	<3% at nominal power								
Max. efficiency (AC to DC) (DC to DC)	98.3% / 99.4%								
Cooling principle	liquid cooled								
Lifetime (converter)	20 years								
Protection Devices									
Battery (DC)	fuse and DC load break switch								
AC side disconnection point	ACB 4-pole								
DC overvoltage protection	surge arrester, type I								
AC overvoltage protection	surge arrester, class I								
Ground fault monitoring	yes								
Earthing	IT system								
Insulation monitoring at AC and DC	yes								
Fire protection	smoke and arc detection, smoke and oxygen exhaust system per battery								