

Switching & Protection solutions for Battery Racks in Battery Systems

UL Commercial & Industrial



Are you searching for Switching and Protection solutions to protect and secure Battery Racks in Utility Scale Battery Energy Storage System (BESS)?

Easily find the best solution to fit in Battery Racks and quickly configure your BESS installation thanks to our pre-configured and tested Application Bundles.

What is a Battery Rack?

A Battery Rack is a cabinet where more battery modules are installed in series to reach the system rated voltage. In addition to the batteries, switching and protective devices are installed along with auxiliary and/or communication circuits.

Why do you need Switching and Protection (S&P) solutions?

Every battery rack requires adequate galvanically switching and protection against overcurrents caused by battery modules. Unlike in PV strings, the overcurrents caused by batteries can be very high according to the battery technology.

Main benefits



Smarter protection

Increases power in your installation and reduces CAPEX by using the full range of 1500 VDC LV components.



Speeds up your projects

Speeds up your projects by using a range of products in compact sizes able to provide excellent performance at different temperatures and humidity ratings.



Smarter metering & monitoring

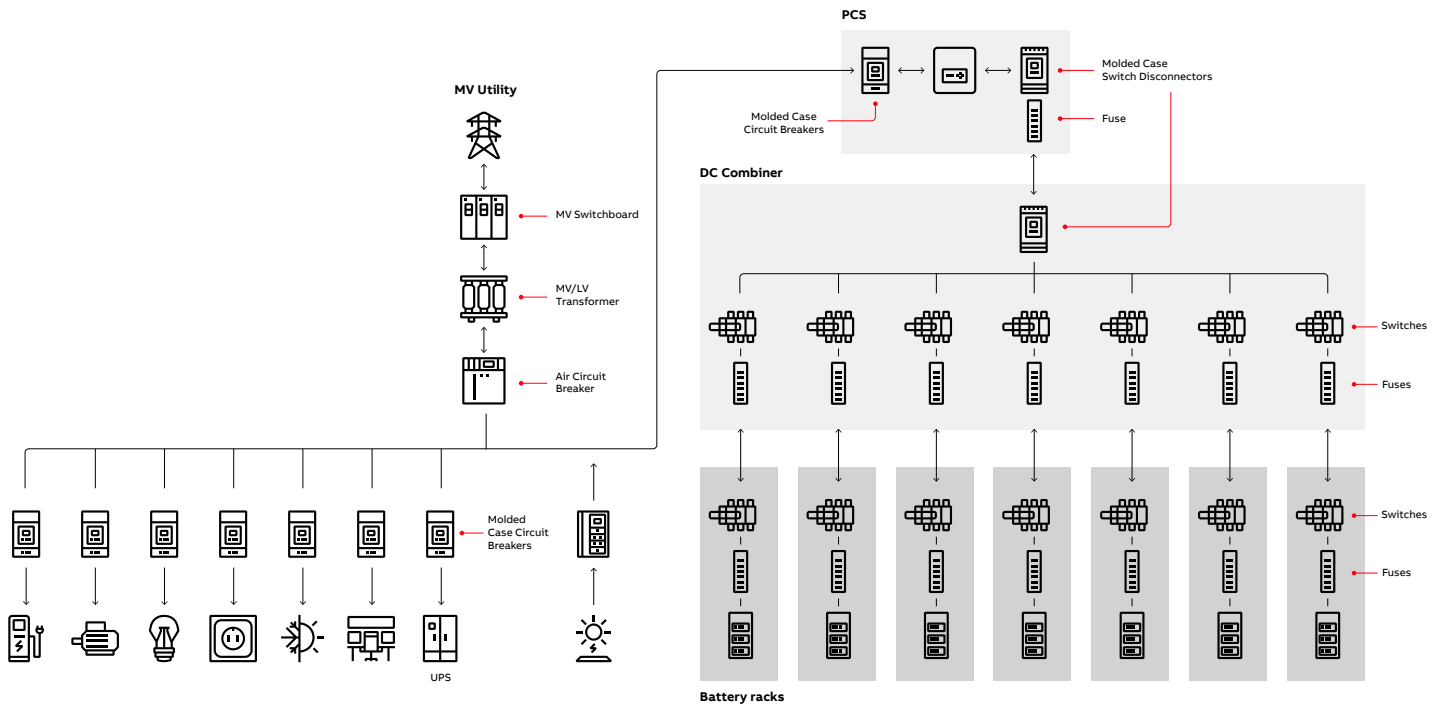
Maximizes power yield and cash generation by correct measurement of your BESS parameters.

Commercial & Industrial Battery Storage

Commercial & Industrial BESS, also known as customer-sited behind-the meter storage systems, represent an ideal solution for managing energy costs by leveraging on peak shaving, load shifting and maximization of self-consumption. By providing critical backup power for commercial & industrial facilities, BESS prevent revenue losses due to production outages and enable fuel savings by replacing gensets during electricity grid power outages of short-medium duration.

Key characteristics:

- Reduce electricity costs, minimize carbon footprint and improve resiliency.
- Manage energy consumption by leveraging on peak shaving, load shifting and maximization of self-consumption.
- Provide critical backup power by supporting/replacing gensets during electricity grid power outages of short-medium duration.
- Allow EV chargers to be installed without a dramatic increase in contractual power from the grid.



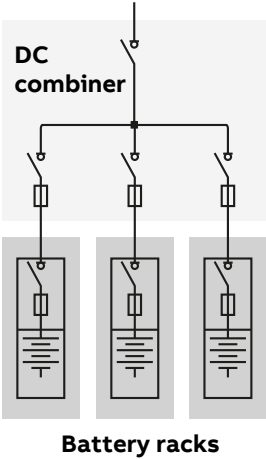


Battery Racks

Fundamentals, main components & functionalities

In Battery Energy Storage Systems, battery racks are responsible for storing the energy coming from the grid or power generator. They provide rack-level protection and are responsible for connecting/disconnecting individual racks from the system.

A typical Li-on rack cabinet configuration comprises several battery modules with a dedicated battery energy management system. The most commonly used batteries in energy storage installations are Lithium-ion batteries; the main topologies are NMC (Nickel Manganese Cobalt) and LFP (Lithium Iron Phosphate).



DC Battery rack main components
Switch-disconnector (Tmax PV/OTDC)
Fuses
Enclosure
Battery modules

Main functionalities:

- Overcurrent protection of battery modules
- Switching and isolation of battery modules

Additional functionality

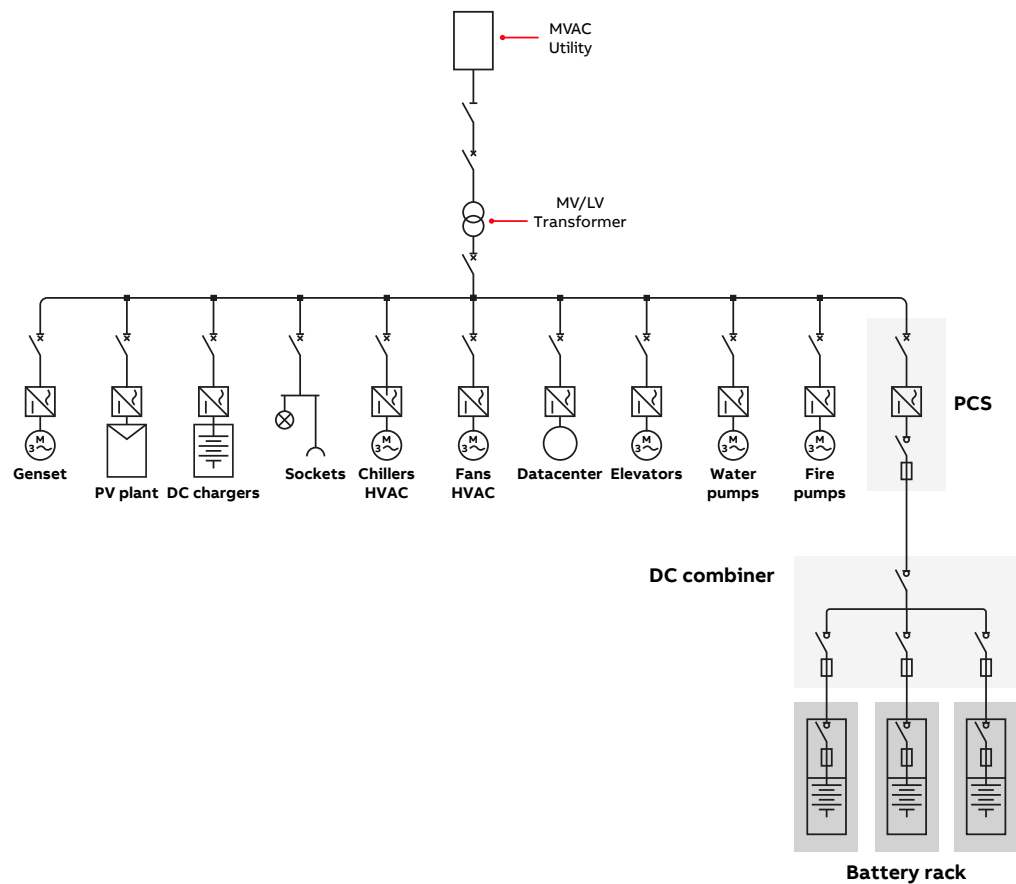
- **Monitoring:** mainly where any drop in BESS plant performance may represent a significant economic loss
- **Voltage, current, or temperature monitoring**
- **Communication:** to communicate parameters to centralized monitoring system.
- **Remotely-operated:** need for remote control

Switching & Protection in Battery Racks for BESS

500 kWh - Commercial and Industrial scale (UL)

Discover our Switching & Protection solutions for easy Battery Racks configuration considering 500 kWh BESS architecture with one single 500 kWh system module.

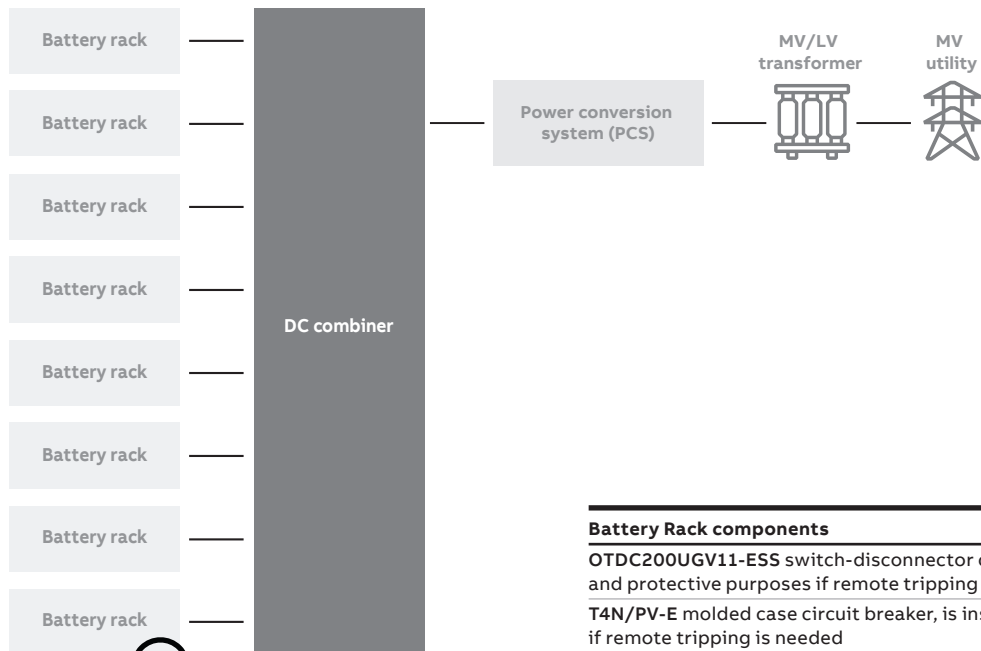
Single-line diagram of 500 kWh module



Specifications of electrical quantities of each single module

500 kWh input data		
Rated power	[kW]	500
Rated stored energy	[kWh]	500
Rated DC voltage	[V]	1500
Rated AC voltage	[V]	600
Rated AC current	[A]	482
Prospective AC short circuit current	[kA]	50
Rack short circuit current	[kA]	7
Number of containers		1
Energy per rack	[kWh]	181
Number of racks per container		3
Rack rated current	[A]	121
DC bus max current	[A]	363
DC bus short circuit current	[kA]	21

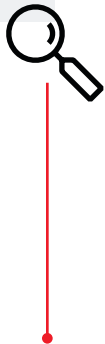
ABB's offering (UL)



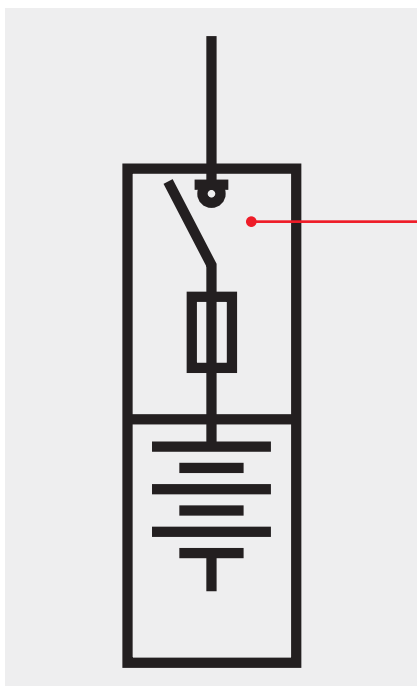
Battery Rack components

OTDC200UGV11-ESS switch-disconnector combined with fuses, is installed for switching and protective purposes if remote tripping isn't needed

T4N/PV-E molded case circuit breaker, is installed for switching and protective purposes if remote tripping is needed



Battery Rack



Moulded case circuit breaker



OTDC



ABB offering – List of components

Product	Part number	Description	Qty
OTDC200UGV11-ESS	1SCA161992R1001	2P 200A DC SW 1500VDC FOR HIGH SCCR	3
T4N/PV-E	1SDA107431R1	T4N/PV-E 250 TMF 200 4P FF 1500VDC N100%	3

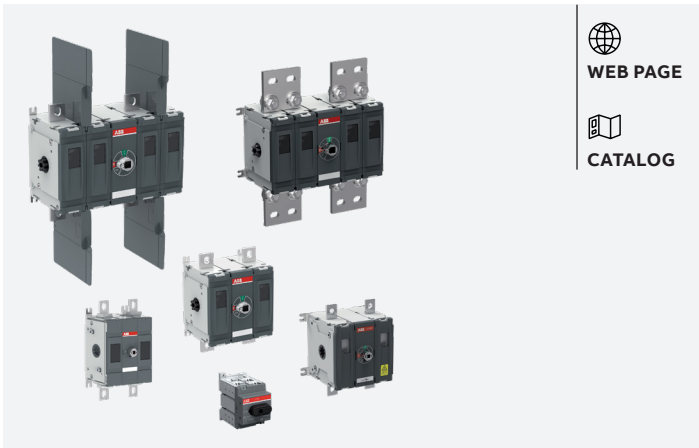


Product offering

Tmax T PV



OTDC



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