

BE – Battery Emulator

The **Battery Emulator** is a regenerative DC/AC converter designed to behave like different kind of batteries. It can emulate a DC output from 12 to 750V. Battery Emulator allows the test of battery chargers, inverters or other kind of system that use batteries without the need of having real batteries. Additionally, it allows considerable energy savings when regenerating the energy to the grid.

6.75 kW – 160 kW

DC output voltage:
12V to 750 V

DC current:
<±690A

Regenerative

Lead-Acid, Ni-MH, Ni-Cd,
Li-Io, Li-Phosphate
emulation

Functional description

Battery emulator can be programmed to behave as different kind of batteries: Lead-Acid, Ni-MH, Ni-Cd, Li-Io, Li-Phosphate.

The programmable parameters of the emulators are: capacity, voltages, maximum and minimum charging and discharging currents, aging, internal resistance, as well as some faults like lower battery level than its minimum voltage, unbalanced or the internal protections.

A virtual Battery Management System (BMS) can be activated with different parameters.

Configurable parameters:

Capacity
Voltage
Charging/discharging currents
Aging
Internal resistance
Emulation of faults:
Battery discharged, unbalanced, internal protections

Regenerative power supply

The converter is based on a hardware topology allowing a bidirectional power flow from the DC input to the grid output providing important energy savings when cycling batteries.

At the same time, higher power test are possible due to this feature.

Profiles for testing

For testing purposes, a power/time profile can be configured.

Applications:

- Testing of battery chargers
- Testing of inverters (in electromobility and renewables environment)
- Testing of storage system
- Vehicle to Grid (V2G) tests



Cooling

Batteries Emulator is air-cooled internally.

Mechanical housing

Power supplies are housed in compact mechanical cabinets with wheels (up to 100kVA) for easier transportation.

User interface

Local 3.2" Touchscreen

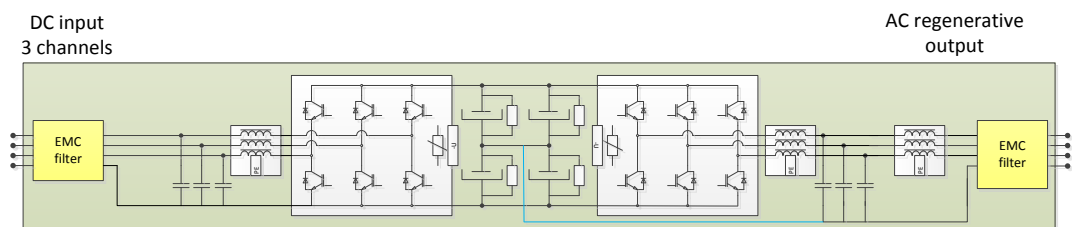
Control port:

- 3 analog inputs +/-10V
- 3 analog outputs 0-10V
- 5 digital inputs optocoupled
- 3 relay outputs
- 1 Emergency stop

Remote interface: Modbus/TCP

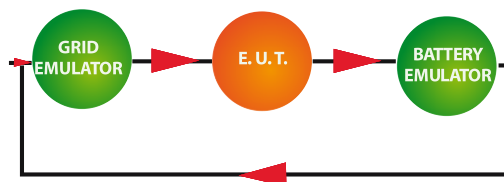
Windows 7/XP application for remote operation and data acquisition.

Technical Diagram

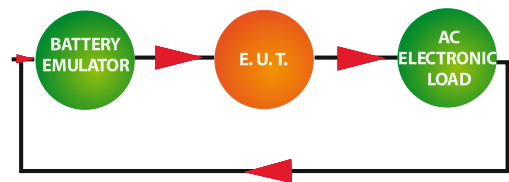


Test Platforms

Battery Chargers Test Platform



Power Converter Test Platform



Option

A line transformer can be installed at the AC input for galvanic isolation.

Range and specifications

Magnitude	Value	
Power	6.75kVA-160kVA	
Input		
AC Voltage	Rated	3x400V+Neutral+Earth
Voltage range	+15% / -20 %	
AC Current	10A-290Arms	
Frequency	50/60Hz	
Power Factor	Controllable	-1/1 (capacitive/inductive)
Efficiency	at full load	>92%
Overload	125% for 10 min / 150% for 60 s	
DC Outputs		
DC Current	3 independent channels	0-230A (per channel)
DC Current	1 parallelized channel	0-690A
DC Voltage	0-750V	
Minimum voltage	at rated power	220V
GENERAL		
Measurements	Input Voltage (Vdc) and Current (Idc)	
	Active and Reactive Input Power (P,Q)	
	Output Voltages (Vrms) and Currents (Irms)	
	Output Power	
	Temperatures	
User interface	3,2" Touchscreen	
	Control port: 3 analog inputs/outputs, 5 inputs, 3 relay outputs	
	Communication Ports: Ethernet, RS485 (optional)	
	Communication Protocols: Modbus/TCP	
	Customized communications for IEC61850, ERP or MATLAB®	
Humidity	10-90% (Absolute maximum, without condensation)	
Temperature	5-40°C (Absolute maximum)	
Refrigeration	Forced air	
Protections	Over Current	
	Shortcircuit	
	Over Voltage	
	Over temperature	
Standards		
Safety	EN-62040-1-2, EN-60950-1	
EMC	EMC: EN-62040-2	

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BE models

Reference	Rated Power		Rated Current		Rated Voltage	Dimensions
	kW	AC	DC (per channel)	DC (total)	DC	DxWxH
BE7.5	6.75	10A	10A	30A	0-750V	700x450x1100
BE10	9	15A	15A	45A	0-750V	700x450x1100
BE15	13.5	20A	20A	60A	0-750V	700x450x1100
BE20	18	30A	25A	75A	0-750V	700x450x1100
BE30	27	40A	40A	120A	0-750V	805x590x1320
BE40	36	55A	50A	150A	0-750V	805x590x1320
BE50	45	70A	65A	195A	0-750V	805x590x1320
BE60	54	85A	80A	240A	0-750V	805x590x1320
BE80	72	115A	105A	315A	0-750V	805x590x1320
BE100	90	145A	130A	390A	0-750V	805x590x1320
BE120	108	175A	155A	465A	0-750V	805x590x1320
BE160	128	230A	185A	555A	0-750V	850x900x2000
BE200	160	290A	230A	690A	0-750V	850x900x2000

Virtual BMS parameters

Virtual BMS parameters
Battery Capacity
Number of batteries
Number of cells
System Power
Charging/discharging currents: Min, Max, Instantaneous
Voltage of cells: Min, Max, Instantaneous
Temperature of battery: Min, Max, Instantaneous
External temperature
Connectors temperature
SOC
SOH
IMR
IMD
VMD
VMR
PMR
PMD
Battery contactors status
Aging
Internal resistance
Alarms
Quantity of energy charged (kWh)
Quantity of energy discharged (kWh)