Battery Bank Voltage, Capacity and Energy (Series–Parallel)

Voltage, ampere-hour capacity and stored energy of a battery bank from the cell or block rating and the number connected in series and in parallel.

Method: Kirchhoff's circuit laws (series voltages add, parallel currents add)

Input parameters

Unit system: SI

Parameter	Value	Unit
Voltage of one battery or cell	12.000	V
Capacity of one battery	150.00	Ah
Batteries in series per string	4.0000	
Strings in parallel	2.0000	

Calculated results

Parameter	Value	Unit
Bank voltage	48.000	V
Bank capacity	300.00	Ah
Stored energy (nominal)	14.400	kWh
Batteries in the bank	8.0000	

Formula and method

$$V = n_s V_b, \quad C = n_p C_b, \quad E = VC$$

Variables

V_b	Voltage of one battery or cell	V
C_b	Capacity of one battery	C
n_s	Batteries in series per string	-
n_p	Strings in parallel	-
V	Bank voltage	V
C	Bank capacity	C
E	Stored energy (nominal)	J
n	Batteries in the bank	-

Method and standards

Series and parallel combination of identical batteries.

Assumptions and limits

- Identical batteries.
- Numbers in series and in parallel are rounded to whole numbers, with a note.

References

- Kirchhoff's circuit laws (series voltages add, parallel currents add)

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/batteries-ups/battery-bank-series-parallel

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.