

UPS Runtime Calculator

Calculate UPS available energy and runtime from usable battery energy, load power, conversion efficiency, and reserved energy before checking the manufacturer runtime curve.

Generated October 9, 2026

<https://www.elecatrix.com/solar-backup-power/ups-runtime-calculator/>

Inputs

Input	Value	Unit
Usable battery energy	1500	Wh
Load power	500	W
Conversion efficiency	90	%
Reserved energy	10	%

Results

Result	Value	Unit
Available energy	1215	Wh
Runtime	2.43	hours
Runtime	145.8	minutes
Efficiency factor	0.9	x
Reserve factor	0.9	x

Calculation details

Detail	Value	Unit
Calculation basis	Available UPS energy equals usable battery energy multiplied by conversion efficiency and by the fraction remaining after reserve.	
Screening boundary	UPS runtime arithmetic only; no battery aging, discharge curve, temperature, transfer time, waveform, load crest factor, listing, or manufacturer runtime curve is applied.	

Formulas

$$E_{\text{available}} = E_{\text{battery,usable}} \times \eta \times f_{\text{reserve}}$$

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$$t_{\text{hours}} = \frac{E_{\text{available}}}{P_{\text{load}}}$$
$$t_{\text{minutes}} = 60 t_{\text{hours}}$$

Warnings and limitations

This is UPS runtime arithmetic only. It does not model discharge curves, battery aging, temperature, waveform, transfer behavior, overload, or manufacturer runtime ratings.