Battery Charger Current and Rating

Charger current to supply a standing DC load and recharge a battery in a set time, with the DC output power and AC input kVA.

Method: Charger sizing for standing load plus recharge

Input parameters

Unit system: SI

Parameter	Value	Unit
Continuous DC load current	20.000	A
Battery capacity	300.00	Ah
Recharge time	10.000	h
Recharge factor (Ah returned / Ah removed)	1.1500	
Charging voltage	123.75	V
Charger efficiency	88.000	%
Charger input power factor	80.000	%

Calculated results

Parameter	Value	Unit
Recharge current	34.500	A
Charger output current	54.500	A
DC output power	6.7444	kW
AC input	9.5801	kVA

Notes for this case

• I = I_L + kC/t_r, from a fully discharged battery. Check the battery maker's maximum charge current (often 0.1–0.25C for lead-acid); choose the next standard charger rating above I.

Formula and method

$$I = I_L + \frac{kC}{t_r}, \quad S_{ac} = \frac{IV}{\eta pf}$$

Variables

I_L	Continuous DC load current	A
C	Battery capacity	C
t_r	Recharge time	s
k	Recharge factor (Ah returned / Ah removed)	-
V	Charging voltage	V
η	Charger efficiency	-
pf	Charger input power factor	-
I_c	Recharge current	A
I	Charger output current	A
P_{dc}	DC output power	W
S_{ac}	AC input	VA

Method and standards

Charger sizing.

Assumptions and limits

- Constant-current recharge from full discharge.

References

Charger sizing for standing load plus recharge

Report details

Report reference	FCC-GXBX-9W9M (the same inputs always give the same reference)
Generated	23 November 2026, 18:08 UTC
Calculator	Battery Charger Current and Rating
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Software release	FireCAD Calc, release of 22 November 2026
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-charger-rating

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.