

How To Set Up Fortress Power Lithium Batteries Using Sol-Ark Inverter

Battery Bank Sizing

Please make sure to go through these steps to make sure you have properly sized your system to avoid damaging your battery. There are 4 ways of properly calculating the battery bank size for a given system as outlined below:

1. Match Inverter Rating to Maximum Current Rating of Battery

$$\sum_{\text{battery bank continuous rating}} \geq \sum_{\text{inverter continuous rating}}$$

&

$$\sum_{\text{battery bank surge rating}} \geq \sum_{\text{inverter surge rating}}$$

2. Calculate the required battery bank capacity based on actual loads

$$\frac{\sum_{\text{total energy used (kwh)}}}{\sum_{\text{total available battery capacity (kwh)}}} \times 100\% \leq 80\%$$

1. Match Inverter Rating to Maximum Current Rating of Battery:

- The LFP-5 has a continuous rating of 80A with 180A surge capacity

$$\begin{array}{l} \sum_{(3) \text{ LFP-5 battery continuous rating}} (80A + 80A + 80A) \geq \sum_{\text{inverter continuous rating}} (185A) \quad \checkmark \\ \sum_{(3) \text{ LFP-5 surge rating}} (180A + 180A + 180A) \geq \sum_{\text{inverter surge rating}} (416A) \quad \checkmark \end{array}$$

- The LFP-10 has a continuous rating of 100A with 200A surge capacity

$$\begin{array}{l} \sum_{(2) \text{ LFP-10 battery continuous rating}} (100A + 100A) \geq \sum_{\text{inverter continuous rating}} (185A) \quad \checkmark \\ \sum_{(2) \text{ LFP-10 surge rating}} (200A + 200A) \geq \sum_{\text{inverter surge rating}} (416A) \quad \times \end{array}$$

- The eVault 18.5 has a continuous rating at 180A with 240A surge capacity

$$\begin{array}{l} \sum_{(2) \text{ eVault battery continuous rating}} (180A + 180A) \geq \sum_{\text{inverter continuous rating}} (185A) \quad \checkmark \\ \sum_{(2) \text{ eVault surge rating}} (240A + 240A) \geq \sum_{\text{inverter surge rating}} (416A) \quad \checkmark \end{array}$$

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2. Calculate the required battery bank capacity based on actual loads.

Every load on the Back-Up Panel will need to be analyzed (load power and duration). All total energy is calculated by summing the individual energies for each load. Assume the following loads and a customer who wants to run 24 hours off batteries only:

1	Appliance	Running wattage	Operating hours/day	Daily Consumption
2	Refrigerator	250 W	12 hrs/day	3 kWh
3	Lights:	100 W	6 hrs/day	0.6 kWh
4	Well Pump	3000 W	1 hr/day	3.0 kWh
5	Internet and continuous Phantom Loads	100 W	24 hrs/day	2.4 kWh
6	TV	200 W	4 hrs/day	0.8 kWh
			Sum	9.8 kWh



REMINDER! Always try to maintain the recommended Depth of Discharge (%DOD) of 80%, for healthy battery life and performance.

1. (x3) LFP-5's = 10.24kwh. Therefore, not acceptable.

$$\frac{\sum_{total\ energy\ used\ (kwh)}(9.8kWh)}{\sum_{total\ available\ battery\ capacity\ (kwh)}(15.36kWh)} \times 100\% = 63.8\% \leq 80\% \quad \checkmark$$

2. (x2) LFP-10 = 10.2kwh. Offering 2 LFP-10's at 20.4 kwh yields approx. 48% DOD. Acceptable, but oversized.

$$\frac{\sum_{total\ energy\ used\ (kwh)}(9.8kWh)}{\sum_{total\ available\ battery\ capacity\ (kwh)}(20.4kWh)} \times 100\% = 48\% \leq 80\% \quad \checkmark$$

3. (x2) eVault at 18.5kwh however, would be the better option.

$$\frac{\sum_{total\ energy\ used\ (kwh)}(9.8kWh)}{\sum_{total\ available\ battery\ capacity\ (kw)}(37.0kWh)} \times 100\% = 26.5\% \leq 80\% \quad \checkmark$$

CONCLUSION: The (x2) LFP 10's may provide enough kWh for the project but would not be compatible with the Sol-Ark inverter due to it's larger Surge rating. (x2) eVaults pass both tests but would be way over-sized at 37.0 kWh. (x3) LFP-5's however, would be a perfect option for this project. It passes both tests while not being oversized.



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This guide covers the recommended set up and configuration of Sol-Ark 8KW Inverter for optimizing performance with Fortress LFP batteries. More information on Fortress products can be found on our website: www.fortresspower.com

Parameter Setting for Fortress **LFP-5, LFP-10 and eVault Series** battery with Sol-Ark 8KW

Battery		
	80% DoD, 6000 cycles	90% DoD, 3000 cycles
Battery Capacity	LFP-5: 100AH per battery LFP-10: 200AH per battery eVault : 360AH per battery	
Max A Charge Rate	LFP-5: 50A per battery LFP-10: 50A per battery eVault:100A per battery	LFP-5: 80A per battery LFP-10: 80A per battery eVault:150A per battery
Max A Discharge Rate	LFP-5: 100A per battery LFP-10: 100A per battery eVault: 160A per battery	
TEMPCO	0	
Use Battery charged	Select	
Use Batt % charged	-	
No Battery	-	
BMS Lithium Batt 01	-	
Active Battery	-	
Charge		
Start V	51.7V / 30%	
A	LFP-5: 50A per battery LFP-10: 50A per battery eVault:100A per battery	LFP-5: 80A per battery LFP-10: 80A per battery eVault:150A per battery
Float V	54.4 V	
Absorption V	54.4 V	54.6 V
Equalization V*	55.5	
	30 days	
	1 hours	
Discharge		
Shutdown	51.3V / 20%	
Low Batt	51.7V / 30%	50.7V / 10%
Restart	51.9V / 40%	
Batt Resistance	5mOhms	
Batt Charge Efficiency	99%	



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Please reassess capacity and charge/discharge current settings, when Fortress battery quantities change.

We appreciate your business. Should you have any questions, please don't be hesitate to contact us! Warm regards,

Fortress Power team