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How To Set Up Fortress Power Lithium Batteries Using [Sol-Ark](#) [Outback](#) Inverters

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Introduction

This integration guide will help set up the charge/discharge parameters of Fortress Power batteries as they relate to ~~Sol-ark-Outback~~ inverters, ~~as well as the setup of closed loop communication between the eFlex 5.4 and the Sol-ark.~~ For any additional help, please contact techsupport@fortresspower.com



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Parameter settings for Fortress batteries with Radian/FXR

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Inverter	80% DoD, 6000 cycles	90% DoD, 3000 cycles
Absorb Voltage and Time	54.4, 1 hour	54.6, 1 hour
Float Voltage and Time	54.4 Time = 0 = Disable	
Re-float Voltage	52.5	
Re-Bulk Voltage	51.5	
AC Input Mode	Grid Tied (default, adjust as needed)	
AC Charger Limit in AC	LFP-5/LFP-10:17A@240V or 34A@120V per battery eFlex/eVault: 30A@240V or 60A@120V per battery	
Low Battery Cut-Out Voltage	50.8	50.3
LBCO Delay	120 seconds	
Low Battery Cut-in Voltage	51.2	
High Battery Cut-Out Voltage	58	
HBCO Delay	10 seconds	
High Battery Cut-in Voltage	55.5	
SellRE (Offset) Voltage	53.2	
Charge Controller		
Absorb Voltage and Time	54.48, 1 hours	54.66, 1 hours
Float Voltage	54.4	
Rebulk Voltage	51.5	
DC Current Limit **	LFP-5/LFP-10:80 A per battery eVault: 150 A per battery eFlex: 100A per battery	
Absorb End Amps	0	
FLEXnet DC (FN-DC)	We recommend to not use Flexnet DC	
Battery AH	LFP-5: 100 per battery eFlex :105 per battery LFP-10: 200 per battery eVault: 360 per battery	
Charge Voltage	54.40	
Charged Return Amps	1% of total battery bank Ah for 10 minutes10A	
Battery Charge	96%	
Relay Invert Logic	No	
Relay Voltage	High = 53.4 ; Low = 49.6	
Relay SOC High/Low	SOC High = 0% SOC Low = 0%	
Relay Delay	High = 1, Low = 0	
MATE3/MATE3s		
FLEXnet DC Advanced	Low SOC Warning = 15%	
FLEXnet DC Advanced	Critical SOC Warning = 10%	



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Battery		
Battery Capacity	80% DoD, 6000 cycles	90% DoD, 3000 cycles
Max A Charge Rate	eFlex: 55A per battery LFP-10: 50A per battery eVault: 100A per battery	eFlex: 60A per battery LFP-10: 80A per battery eVault: 150A per battery
Max A Discharge Rate	eFlex: 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	eFlex: 55A per battery LFP-10: 50A per battery eVault: 100A per battery	eFlex: 60A 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	
	0 hours	
Discharge		
Shutdown	51.4V / 20%	
Low Batt	51.7V / 30%	50.7V / 10%
Restart	51.9V / 25%	
Batt Resistance	5mOhms	
Batt Charge Efficiency	98%	

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

Integrating with a SkyBox

The settings below should be programmed into the unit under the Custom choice. Please consult the SkyBox Programming Guide for detailed instructions on how to adjust these settings.



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<u>Inverter</u>	
<u>Maximum SOC</u>	100%
<u>Minimum SOC</u>	20%
<u>Absorb Charge</u>	Timed
<u>Absorb Voltage</u>	54.4 Vdc
<u>Absorb Time</u>	00:20
<u>Float Charge</u>	Disabled
<u>Float Voltage</u>	Can be left at default
<u>Float Time</u>	Can be left at default
<u>Re-float Voltage</u>	52.5 Vdc
<u>Re-bulk Voltage</u>	51.5 Vdc
<u>Equalize Voltage</u>	54.4 Vdc
<u>Minimum Equalize Time</u>	00:00
<u>Max Charge Current (Adc)</u>	LFP-5 & LFP-10: 50Adc eVault: 100Adc eFlex: 70Adc
<u>Max Discharge Current (Adc)</u>	LFP-5 & LFP-10: 90Adc eVault: 125Adc
<u>Grid Charge Limit (kW)</u>	Site specific
<u>Low Battery Cutout</u>	50.2 Vdc
<u>LBCO Delay</u>	15 seconds
<u>Low Battery Cut-in</u>	51.0 Vdc
<u>High Battery Cutout</u>	56.0 Vdc
<u>HBCO Delay</u>	10 seconds
<u>High Battery Cut-in</u>	55.5 Vdc
<u>Battery Series</u>	Custom
<u>Battery Model Number</u>	Custom
<u>Battery Description</u>	Fortress Power
<u>Battery Total Amp-Hours</u>	eFlex: 105Ah LFPP-10: 200Ah eVault: 360 Ah
<u>Charge Efficiency Factor</u>	96%
<u>Absorb End Amps</u>	10.0 Adc



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**Ensure the maximum battery charging current is not exceeded after all charge controllers are taken into consideration (i.e. – 2 FM100 controllers would charge at 200 A total, a violation of the limit if only one LFP-10 is used).

Best Practice Operation

During testing, it was seen that a commissioning charge was necessary to properly calibrate the SkyBox state of charge monitor. If possible, a full load test should also be performed. Each time the battery reaches the low battery cutout voltage, the SkyBox recalculates a state-of-health (SOH) for the battery. This number is used to more accurately track the SOC.

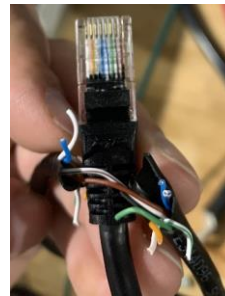
—Setting up closed loop communication between eFlex 5.4 and Sol-ark

All Fortress Power batteries work in open loop communication mode—that is, with voltage detection. However, closed loop communication between the eFlex 5.4 and the Sol-ark inverter improves the efficiency of a lithium battery. The following is a guide to setting up closed loop communication between the eFlex 5.4 and the Sol-ark inverter

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Connecting the eFlex to the Sol-ark inverter

A modified RJ45 cable must be made to ensure proper communication to the SolArk inverter. Cut into the ethernet cable, cutting through all wires except pin 7+8 (brown white and brown). The eFlex BMS communicates in both RJ485 modbus and canbus, but the SolArk RJ485 connection gets confused when it hears both signals. Tape the RJ45 cable back up and connect between the
Connect a CAT6 cable into the eFlex (Exhibit A) (Exhibit A) and then into the RJ46 pinout converter. Using another CAT6 cable, connect the pinout converter to the RS485 port in the Sol ark (Exhibit B). See above picture.



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1- The middle of this ethernet cable has been cut into, with all wires except pin 7+8 cut, to disable all EFlex-> SolArk communication except RJ485 A+B

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Power on the eFlex and Sol-ark as usual and navigate to the “battery setup” menu on the Sol-ark. Next, check the “Use Batt % charged” box as well as the “BMS Lithium Batt” box and set it to “04” (Exhibit D). If the communication is successful, a new menu option should open in the battery monitoring page and the screen that appears should show a table of detailed battery information (Exhibit E) for each battery connected.

This data can also be monitored remotely using Sol-ark’s monitoring software and wifi module. For remote monitoring using Sol-ark the wifi module, please refer to the guide on the Sol-ark website.



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Appendix

Exhibit A

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Exhibit B



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RJ45 pinout
connector

RS485 port

Exhibit C

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Exhibit D
