



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

Introduction

This integration guide will help set up the charge/discharge parameters of Fortress Power batteries as they relate to Sol-ark inverters, as well as the setup of closed-loop communication between the eFlex 5.4 and the Sol-ark.

Datasheets / Manuals: <https://www.fortresspower.com/resources/>

Email: techsupport@fortresspower.com

Discord Support: <https://discord.gg/kxX6QMjKfw>

Phone: (877) 497-6937 x 2

Hours: 8:30AM - 6:30PM EST

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IMPORTANT! *Fortress batteries may require disassembly if voltage drops below 40V-44V. OpticsRE, OutBack's free remote monitoring system, can be configured to send an email notification on low battery to help warn and avoid a complete discharge of the battery.*

Radian / FXR Inverter Settings (divide voltage by 2 for 24V FXR settings)

<u>Inverter</u>	80% DoD, 6000 cycles 90% DoD, 3000 cycles
<u>Absorb Voltage and Time</u>	54.4 Vdc / 2.0 hr 54.4, 1 hour 54.6, 1 hour
<u>Float Voltage and Time</u>	54.4 Vdc / 0.0 hr 54.4 Time = 0 = Disable
<u>Re-float Voltage</u>	52.54 Vdc
<u>Re-Bulk Voltage</u>	51.2 Vdc
<u>AC Input Mode</u>	Grid Tied (default, adjust as needed)
<u>AC Charger Limit in AC</u>	LFP-5/LFP10: 15 Aac per battery LFP-10: 17A@240V or 34A@120V per battery eFlex: 15 Aac per battery eVault: 30 Aac per battery: 30A@240V or 60A@120V per battery
<u>Low Battery Cut-Out Voltage</u>	49.6V 50.8 50.3
<u>LBCO Delay</u>	1320 seconds
<u>Low Battery Cut-in Voltage</u>	51.2
<u>High Battery Cut-Out Voltage</u>	56.4V
<u>HBCO Delay</u>	10 seconds
<u>High Battery Cut-in Voltage</u>	55.2V
<u>SellRE (Offset) Voltage Max</u>	53.2-51.6V for "zero-outflow", 53.6V for selling at "100% full"
<u>Temp Sensors</u>	<i>Do not use temperature sensors / reduce any temperature coefficients to as close to zero as allowed</i>
<u>Charge Controller:</u>	
<u>Absorb Voltage and Time</u>	54.48, 1 hours 54.66, 1 hours
<u>Float Voltage</u>	54.4
<u>Rebulk Voltage</u>	521.5 <i>note: different than above inverter</i>
<u>DC Current Limit **</u>	LFP-5/LFP-10: 80 A per battery eVault: 150 A per battery eFlex: 100A per battery
<u>Absorb End Amps</u>	1A0
<u>FLEXnet DC (FN-DC)</u>	We recommend uninstalling the to not use Flexnet DC
<u>Battery AH</u>	LFP-5: 100 per battery eFlex: 105 per battery

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	<u>eVault: 360 per battery</u>	
<u>Charge Voltage</u>	54.40	
<u>Charged Return Amps</u>	<u>1A1% of total battery bank Ah for 150 minutes</u> 10A	
<u>Battery Charge</u>	96%	
<u>Relay Invert Logic</u>	No	
<u>Relay Voltage</u>	High = 533.84 ; Low = 5149.26	
<u>Relay SOC High/Low</u>	SOC High = 0% SOC Low = 0%	
<u>Relay Delay</u>	High = 1, Low = 0	
<u>MATE3/MATE3s</u>		
<u>FLEXnet-DC Advanced</u>	Low SOC Warning = 15%	
<u>FLEXnet-DC Advanced</u>	Critical SOC Warning = 10%	
Battery		
	80% DoD, 6000 cycles	90% DoD, 3000 cycles
<u>Battery Capacity</u>	eFlex: 105AH per battery LFP-10: 200AH per battery eVault: 360AH per battery	
<u>Max A Charge Rate</u>	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
<u>Max A Discharge Rate</u>	eFlex: 100A per battery LFP-10: 100A per battery eVault: 160A per battery	
<u>TEMPCO</u>	0	
<u>Use Battery charged</u>	Select	
<u>Use Batt % charged</u>	-	
<u>No Battery</u>	-	
<u>BMS Lithium Batt 01</u>	-	
<u>Active Battery</u>	-	
Charge		
<u>Start V</u>	51.7V / 30%	
<u>A</u>	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
<u>Float V</u>	54.4 V	
<u>Absorption V</u>	54.4 V	54.6 V
<u>Equalization V*</u>	55.5	
	30 days	
	0 hours	
Discharge		
<u>Shutdown</u>	51.4V / 20%	
<u>Low Batt</u>	51.7V / 30%	50.7V / 10%



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Restart	51.9V / 25%
Batt Resistance	5mOhms
Batt Charge Efficiency	98%



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SkyBox Inverter Settings

The settings below should be programmed into the unit under the **Custom** choice.

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<u>Inverter</u>	
<u>Maximum SOC</u>	<u>100%</u>
<u>Minimum SOC</u>	<u>20%</u>
<u>Absorb Charge</u>	<u>Timed</u>
<u>Absorb Voltage</u>	<u>54.4 Vdc</u>
<u>Absorb Time</u>	<u>02:00 hr</u>
<u>Float Charge</u>	<u>Disabled</u>
<u>Float Voltage</u>	<u>Can be left at default</u>
<u>Float Time</u>	<u>Can be left at default</u>
<u>Re-float Voltage</u>	<u>54.4 Vdc</u>
<u>Re-bulk Voltage</u>	<u>52.5 Vdc</u>
<u>Equalize Voltage</u>	<u>54.4 Vdc</u>
<u>Minimum Equalize Time</u>	<u>00:00</u>
<u>Max Charge Current (Adc)</u>	<u>LFP-5 & LFP-10: 50Adc</u> <u>eVault: 100Adc</u> <u>eFlex: 55Adc</u>
<u>Max Discharge Current (Adc)</u>	<u>LFP-5 & LFP-10: 90Adc</u> <u>eVault: 125Adc</u> <u>eFlex: 60Adc</u>
<u>Grid Charge Limit (kW)</u>	<u>Site specific</u>
<u>Low Battery Cutout</u>	<u>50 Vdc</u>
<u>LBCO Delay</u>	<u>15 seconds</u>
<u>Low Battery Cut-in</u>	<u>51.0 Vdc</u>
<u>High Battery Cutout</u>	<u>56.0 Vdc</u>
<u>HBCO Delay</u>	<u>10 seconds</u>
<u>High Battery Cut-in</u>	<u>55.5 Vdc</u>
<u>Battery Series</u>	<u>Custom</u>
<u>Battery Model Number</u>	<u>Custom</u>
<u>Battery Description</u>	<u>Fortress Power</u>
<u>Battery Total Amp-Hours</u>	<u>eFlex: 105Ah</u> <u>LFPP-10: 200Ah</u> <u>eVault: 360 Ah</u>
<u>Charge Efficiency Factor</u>	<u>96%</u>
<u>Absorb End Amps</u>	<u>1Adc</u>



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Charge Controller Settings



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

Charge Controller	
Absorb Voltage and Time	54.4, 2 hours
Float Voltage	54.4
Rebulk Voltage	52.5 note: higher than inverter
DC Current Limit	LFP-10: 80A per battery ÷ # of controllers eVault: 170A per battery ÷ # of controllers eFlex: 55A per battery ÷ # of controllers
Absorb End Amps	1A

Communication Settings

FLEXnet DC (FN-DC)	<i>If FLEXNET DC display voltage is not within 0.1V of inverter terminal voltage, calibrate Outback equipment</i>
Battery Amp hour	eFlex :105Ah per battery LFP-10: 200Ah per battery eVault: 360Ah per battery
Charged Voltage	54.0V
Charged Time	15 minutes
Charged Return Amps	1A
Battery Charge	96%
Relay Invert Logic	No
Relay Voltage	High = 53.8 ; Low = 51.2
Relay Delay	High = 1, Low = 0
MATE3/MATE3s	
FLEXnet DC Advanced	Low SOC Warning = 15%
FLEXnet DC Advanced	Critical SOC Warning = 10%

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.

Inverter	
Maximum SOC	100%



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<u>Minimum SOC</u>	<u>20%</u>
<u>Absorb Charge</u>	<u>Timed</u>
<u>Absorb Voltage</u>	<u>54.4 Vdc</u>
<u>Absorb Time</u>	<u>00:20</u>
<u>Float Charge</u>	<u>Disabled</u>
<u>Float Voltage</u>	<u>Can be left at default</u>
<u>Float Time</u>	<u>-Can be left at default</u>
<u>Re-float Voltage</u>	<u>532.15 Vdc</u>
<u>Re-bulk Voltage</u>	<u>521.5 Vdc</u>
<u>Equalize Voltage</u>	<u>54.4 Vdc</u>
<u>Minimum Equalize Time</u>	<u>00:00</u>
<u>Max Charge Current (Ade)</u>	<u>LFP-5 & LFP-10: 50Ade</u> <u>eVault: 100Ade</u> <u>eFlex: 5570Ade</u>
<u>Max Discharge Current (Ade)</u>	<u>LFP-5 & LFP-10: 90Ade</u> <u>eVault: 125Ade</u> <u>eFlex: 60Ade</u>
<u>Grid Charge Limit (kW)</u>	<u>Site specific</u>
<u>Low Battery Cutout</u>	<u>50.82 Vdc</u>
<u>LBCO Delay</u>	<u>15 seconds</u>
<u>Low Battery Cut-in</u>	<u>51.0 Vdc</u>
<u>High Battery Cutout</u>	<u>56.0 Vdc</u>
<u>HBCO Delay</u>	<u>10 seconds</u>
<u>High Battery Cut-in</u>	<u>55.5 Vdc</u>
<u>Battery Series</u>	<u>Custom</u>
<u>Battery Model Number</u>	<u>Custom</u>
<u>Battery Description</u>	<u>Fortress Power</u>
<u>Battery Total Amp-Hours</u>	<u>eFlex: 105Ah</u> <u>LEFP-10: 200Ah</u> <u>eVault: 360 Ah</u>
<u>Charge Efficiency Factor</u>	<u>96%</u>
<u>Absorb End Amps</u>	<u>10.0 Ade</u>



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Best Practice Operation

Calibrate FlexNet DC Instructions:

https://www.outbackpower.com/downloads/documents/appnotes/fndc_field_cal_app_note.pdf

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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
Connect a CAT6 cable into the eFlex (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).
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.

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Appendix
Exhibit A

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Exhibit B



RJ45 pin
connect

RS485 port

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Exhibit-C

Exhibit-D