

## OutBack Chargers with Blue Ion 2.0 Batteries

The following pages detail specific settings and methods used when integrating a Blue Planet Energy Blue Ion 2.0 LFP Energy Storage System with OutBack equipment, including the FLEXnet DC Battery Monitor (FN-DC). It is broken into two sections, one for integration with the Radian or FXR inverters and one section for integration with SkyBox. Also found in the paper is a discussion of 'best fit' FN-DC settings and state of charge monitoring with lithium batteries.

### Integrating the Blue Ion 2.0 with SkyBox

When integrating a Blue Ion 2.0 battery with a SkyBox, simply choose the Blue Ion 2.0 option when configuring the **Battery Series**. All of the charging settings are pre-populated. The next item, **Battery Model Number**, will be the Blue Ion model number of the battery. Currently, only the 16kWh model is available as a standard selection. When using a smaller model as a custom selection, edit the **Battery total amp-hours** and **Absorb end amps** to the appropriate settings. These settings can be found in the Radian/FXR table on the next page (**Absorb End Amps** and **Battery Ah**).

BATTERY SETTINGS	
Battery series	Battery model number
Blue Ion 2.0	Blue Ion 2.0 16kWh
Battery description	Battery total amp-hours (Ah)
	320
Battery installation date	Battery manufacture date
02/2019	01/2019

## Integrating the Blue Ion 2.0 with Radian/FXR

The following charge settings should be used when programming the Radian or FXR.

Inverter	Setting
<b>Absorb Voltage</b>	55.2 Vdc
<b>Absorb Time</b>	0.2 hr
<b>Float Voltage</b>	55.2 Vdc
<b>Float Time</b>	0.0 hr
<b>Re-float Voltage</b>	Default
<b>Re-bulk Voltage</b>	52.8 Vdc
<b>Sell Voltage</b>	54 Vdc
<b>AC Charger Limit</b>	30 Aac <sup>1</sup>
<b>Low Battery Cutout</b>	48.0 Vdc
<b>LBCO Delay</b>	120 seconds
<b>Low Battery Cut-in</b>	49.2 Vdc
<b>High Battery Cutout</b>	60 Vdc
<b>HBCO Delay</b>	10 seconds
<b>High Battery Cut-in</b>	58 Vdc
<b>Charge Controller</b>	
<b>Absorb Voltage</b>	55.6 Vdc <sup>2</sup>
<b>Absorb Time</b>	0.2 hr
<b>Float Voltage</b>	55.6 Vdc
<b>Re-bulk Voltage</b>	50.0 Vdc
<b>DC Current Limit</b>	60/80/100 Adc <sup>3</sup>
<b>Absorb End Amps</b>	0 Adc
<b>FN-DC</b>	
<b>Battery Ah</b>	160/240/320 Ah <sup>4</sup>
<b>Charged Voltage</b>	55.2 Vdc
<b>Charged Time</b>	30 min
<b>Charged Return Amps</b>	1.5/2.2/3.0 Adc <sup>4</sup>
<b>Battery Charge Efficiency</b>	96%
<b>MATE3s<sup>5</sup></b>	
<b>FN-DC Advanced</b>	Low SOC Warning = 20%
<b>FN-DC Advanced</b>	Critical SOC Warning = 10%

Table 1 – Radian/FXR charging settings

Equalization settings are not included in this table. The Blue Ion 2.0 Battery Management Unit (BMU) automatically performs a balancing process when the cells reach 100% SOC. Setting the equalize time to 0.0 hours will prevent the Radian and charge controller from entering the equalize mode.



### CAUTION: Hazard to Equipment

Temperature compensation should never be used with lithium batteries.

<sup>1</sup> This value is based on the Radian 8048A model. Other models may have smaller maximums available. Set this value to 30A or the maximum value, whichever is less.

<sup>2</sup> 0.4V higher than inverter absorb and float values to prioritize solar charging.

<sup>3</sup> Max current limit based on charge controller model.

<sup>4</sup> Based on the 8/12/16 kwh battery models

<sup>5</sup> These settings are only available at the MATE3s itself, not through OPTICS RE.

## State of Charge Monitoring

Using the settings above, several tests were performed to monitor the accuracy of the OutBack FLEXnet DC Battery Monitor against the Blue Ion 2.0 eGauge monitor. In all scenarios, the FN-DC and eGauge began to diverge when the battery was heavily discharged. When SOC was high (>90%), the average difference between the two measurement devices was between zero and one percent. The greatest average differences occurred at very low SOC (<20%). In most cases, the FN-DC erred low relative to the eGauge.

A graph of state of charge measured against the SOC difference between the FN-DC and the eGauge is provided for reference.

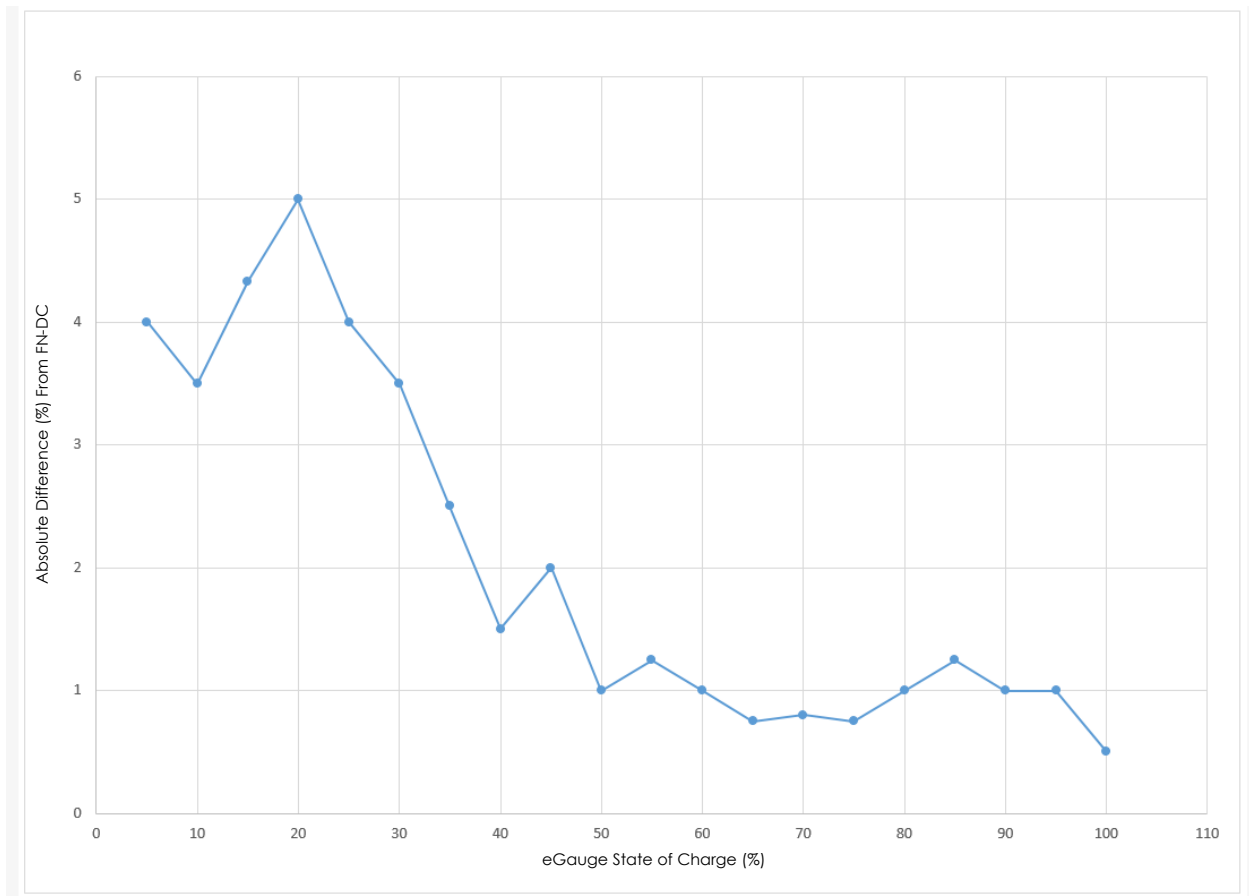


Figure 2 – Graph depicting SOC differences between the FN-DC and the eGauge

## About OutBack Power

OutBack Power is a leader in advanced energy conversion technology. OutBack products include true sine wave inverter/chargers, maximum power point tracking charge controllers, and system communication components, as well as circuit breakers, batteries, accessories, and assembled systems.

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## Other

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