

The Seven Steps to Highly Efficient FLEXnet DC (FN-DC) Programming

There are seven basic settings, that when properly entered activate a powerful measurement tool!

- 1 The correct Amp Hours of your battery bank must be entered.
- 2 Enable the correct shunts.
- 3 The Return Amps must be entered.
- 4 The End of Charge Voltage must be entered
- 5 Battery Charge Factor (BCF) must be validated
- 6 The Charge Parameters Met Time must be entered.
- 7 Synchronization with an FN-DC & your Fully charged Battery bank

These steps are done from the main screen of the MATE. To get to the Main screen on the MATE press the bottom left 2 buttons simultaneously.

Step # 1: To enter Amp Hours go to the **ADV/ (enter password 141)/ DC/ Press BAT.** Using the inc or the dec buttons enter the amp-hours of your battery bank. This value is based on your 20 hour rate discharge capacity.

Step # 2: Enable Shunt(s). Only enable the respective shunts that will be active. **ADV/ (enter password 141)/ DC/ SHUNT.**

You may confirm which shunt is active by going to Main screen and go to **STATUS/DC/METER.** You should notice that when your batteries are charging they are receiving a positive number and a negative number when current is leaving your batteries. If the reverse is happening you need to switch the polarity on the sensing wires on either your shunt or FN-DC.

Step # 3: Return Amps, **ADV/ DC/CHARGE** This is the charge rate that is expected to be returned to your batteries when they are full or approaching full. This value is derived from a percentage of the total amp hours in your battery bank. This value can be attained from your battery manufacture. 2% of your total amp hours is a good default to establish our baseline. For example a 250 Amp hour battery bank @ 20hr discharge rate with a 2% value of return amps would be $250 \times .02 = 5$ amps.

Another more concrete method to find your return amps value would be to charge your batteries until they are full using the battery manufacture charging values to include specific gravity readings if applicable. Then simply do another rebulk and absorb by simply pushing "AC IN" once and tell it to "DROP" and then tell it to "USE". Select "OK" to exit. Then monitor the current holding your absorb voltage by viewing the shunt activity (positive amps) returning to the battery bank with no loads on the batteries. Set the return amps to this value.

FYI: This value will change as the batteries age. The return amps for brand new batteries could be as low as 1%. The return amps for older batteries may be as much as 3% perhaps more depending on their condition. Therefore our suggested default value is 2%, and adjust the Battery Charge Factor (BCF) Step #5 if adjusting is needed.

Step # 4: Battery End of Charge Voltage, ADV/ DC/CHARGE (select down – this parameter setting is beneath the “return amps”)

This value is based on your absorption voltage that can be found in the parameters you set with your battery manufactures settings. **ADV/FX/CHARGER** (select down to you see this value and confirm each port too).

For a 12/24 volt system it should be set .2 of a volt less the absorption voltage.

For a 48 volt system it should be set .4 of a volt less the absorption voltage.

The manual calls this the Battery End of Charge Voltage on the MATE this is labeled battery voltage. Do not let this confuse you.

For example: Your battery manufacture suggested for you to set your FX charger absorbs voltage to 55 volts for 3 hours. Thus for the FN-DC Battery End Charge Voltage you must subtract .4 volts from your absorb voltage to have your “Battery End of Charge Voltage” which equals 54.6 volts.

Step # 5: Charge Parameters Met Time

From the factory this is set to 1 minute. This is user adjustable but usually the default value is optimal.

Step # 6: Charge Factor (BCF)

From the factory this is set to 94%, and this would be the value that would require adjusting only after several battery charging and usage cycles. The BCF is defined as a compensation factor for losses in the recharging and discharging of the battery by discounting amp hours during the charging of the battery only. For example, the FN-DC doesn't count every amp hour used for recharging because during recharging it actually has losses related to gassing and heating – so for every 100 amp hours of charge only 94 are shown in the amp hour display (94% BCF). FYI: The amp hours removed from the battery are counted for 100%.

Step # 7: To synchronize the FN- DC to a fully charged battery check steps 1-6. The unit will remember the settings and start at 100% SOC.

The FN-DC is a battery monitor it only knows what you tell it.

**IF YOU LIE TO IT,
IT WILL LIE TO YOU.**

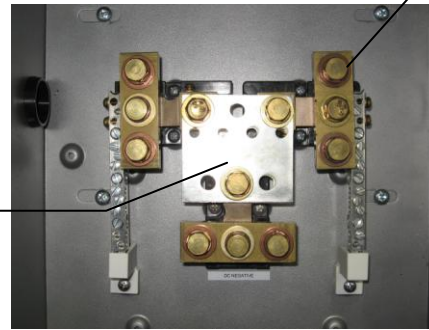
Frequently Asked Questions:

What type of shunt do I need?

OutBack recommends our FW-SHUNT250 or FW-SHUNT500, with an FW-SBUS or FW-BBUS for multiple items to pass or to join gang multiple shunts. By adding our BUS bar you increase the capacity of our shunt. These shunts are rated to measure at 500 Amps / 50 mV.

This is an example of a triple shunt in a “Y” configuration.

FW-BBUS



FW-SHUNT 500 & FW-SBUS

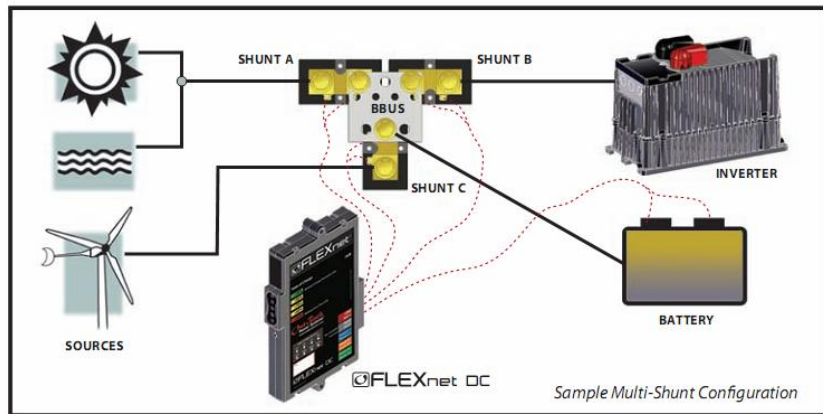
Can a shunt be connected to a positive grounded system?

No, and our FN-DC will not function either.

How can I test my Shunt?

You can measure millivolts with your voltmeter across the terminals of the shunt.

One millivolt equals ten amperes (+ probe goes on battery side). Observe the polarity when you are charging and discharging – it should reflect what you are seeing in Step # 2 & 6 above.



Does a shunt come with the FN-DC kit?

No, unless you purchased the OutBack Power Systems FW500 or FW1000 DC enclosure, which comes with a shunt, you need to purchase one from your distributor.

My battery State of Charge (SOC) says 100% but my battery voltage or specific gravity isn't 100%?

Your FN-DC still needs some calibrating with your battery bank. Review your settings in Steps 1-7 above, if you have gone through multiple usage and full charge cycles with out adjusting any values – then and only then should you lower your BCF (see Step #5). Then do Step #7 and go through multiple usage and full charge cycles prior to making any further adjustments to the BCF to fine tune your system.

Frequently Asked Questions Continued:

I have no power at my FN-DC?

Your FN-DC is recommended to have an over current protection of less than 5 amps, and this device should be checked for open circuit. The FN-DC must be plugged into the HUB in one of the port numbers after the FX inverters. FYI: Unplugging the FN-DC and plugging it back in at the HUB synchronizes the SOC to be full– see Step #7.

How do I reset the FN-DC?

To reset the unit to factory defaults go to **ADV/DC/PG3** then select **RESET**.

How do I use the relay?

The relay is a 5 amp, 30 volts rated relay and needs over current protection. This dry contact relay has invert logic capabilities that can be used to control a generator (we recommend using it with the MATE's AGS feature), alarm, light, or other low voltage devices. The FN-DC manual explains how to utilize this feature. http://www.outbackpower.com/pdf/manuals/flexnet_dc.pdf page 16

What MATE software revision do I need to use the FN-DC?

You need at least 4.0.4. You can examine what MATE code revision you have by going to the following menu from the main menu with the clock: **SETUP/MATE/PAGE** If you have a MATE that has older firmware you may contact OutBack Power Systems to have free firmware upgrade on your device support@outbackpower.com or (360) 618-4363.

I want to sell energy back to the grid with my GTFX, but I want my batteries to receive a full charge first. Can the FN-DC help?

Yes, on the MATE (with MATE code firmware 4.1.6) we have “Advanced grid tie authority” that, when enabled, will tell the FN-DC to fully charge the batteries each morning prior to selling. This feature can be found at **ADV/MATE/PG4/MODE**

When will my “Days Since Full” go back to zero?

“Days Since Full” could have been labeled “Days since Parameters Met”. The FN-DC will be content to reset “Days Since Full” when it observes the parameters programmed on steps 3 through 5 are satisfied, and then only when ~ 1 minute after the first amp begins to leave the battery after it's charge. *Tip: If you have inaccurate parameters you will have an invalid state of battery charge displayed that is capable to be enabled to be controlling selling, charging, etc.*