Dragonfly Energy

Battle Born Batteries

Model BB10012|BB10012H|BBGC2
Manual and Installation Guide

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Thank you for purchasing with Battle Born Batteries. Please read this prior to installation. If you have a heat enabled model, please refer to the additional Heat Enable Instruction manual prior to use and install.

Charging Parameters

Bulk/Absorption

For your Bulk/Absorption stage, the ideal voltage is between 14.2V - 14.6V. For full charge and balance, the absorption mode should be set for at least 20 minutes per battery (for multiple batteries in parallel).

Float

Our batteries do not need a float stage for charging, but a float voltage between 13.4V and 13.8V can be used when connected to shore power.

Equalization

Equalization is not recommended for our batteries. Most chargers will allow you to disable this feature or use a setting that does not use equalization. If you cannot turn off this mode, then you will need to adjust the equalization voltage to below 14.4V or set to 0V if possible.

Temperature Compensation

Temperature compensation is not needed with our batteries and in some cases, may trigger the built in BMS to go into protect mode. For this reason, we recommend that temperature compensation be disabled or set to 0.

BMS Basic Features

All Battle Born Batteries come with a built-in battery management system (BMS) that protects the cells for long-term cycling. The BMS protects against the following conditions:

High Voltage Disconnect: > 14.7V

If an individual cell voltage exceeds a prescribed threshold during charging, the BMS will prevent a charge current from continuing. Discharge is always allowed under this condition.

Low Voltage: < 10V

If an individual cell falls below a prescribed threshold during discharge, the BMS will prevent further discharge. Although the battery is in "low-voltage disconnect" mode, it will still allow a charging current.

***NOTE: Many chargers must detect a voltage over 10V to send a charge to the battery.** Please be aware that some chargers may not sense a battery in low voltage disconnect and you may need to jump with a 12V source to "wake up" the battery. You should jump your battery **within 24hrs** of entering low voltage disconnect otherwise you risk damaging your battery and voiding the warranty.

High Temperature: > 135°F

The BMS will not allow a charging or discharging current if the internal temperature of the battery has reached 135°F.

Low Temperature: < 25°F

The BMS will not allow a charging current under 25°F, but will continue to discharge down to -4°F.

High Current

The BMS will not allow a current that exceeds 100 (+/- 5%) Amps for more than 30s, or 200 (+/- 10%) Amps for more than 0.5s. Although these thresholds have been verified with a DC load bank, the 30-second-high current threshold may be reduced from 200A to around 150A for certain highly variable loads through an inverter – like a microwave or space heater. After a high current disconnection, the battery will automatically reconnect after 5 seconds.

A passive balancing process is activated by the BMS at the top of each charge cycle when the battery voltage exceeds around 14V. This ensures that all the cells remain at the same state of charge, which helps for pack longevity and performance.

Operating Temperature Range: -4°F to 135°F

IEC 62133 certification mandates that charging has been certified between 37F and 113F (3C and 45C).

Installation

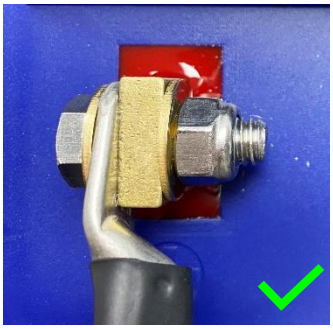
The batteries may be mounted in any orientation, but care must be taken in connecting to the battery terminals. The positive and negative terminals are labeled and color coded
(**red for positive +**, **black for negative -**).

***DO NOT** reverse polarity of the battery as this will damage both the battery and the device being connected.

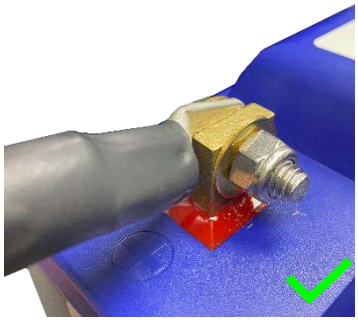
The batteries come standard with a flag style terminal post with a 3/8” hole to accommodate a 5/16” bolt and lug sizes up to 2 or 2/0. All batteries ship with 18-8 stainless steel 5/16–18 x 1” and 1 ¼” long bolts, stainless steel washers, and 18-8 stainless steel nuts with nylok inserts. When connecting to the battery terminals, make sure that your bolt **can fully seat into the nylok insert of the nut**. If it is unable to do so, use a longer bolt to connect to the terminals. If multiple lugs are used, longer bolts may be required for the bolt to fully seat into the nylok insert of the nut.

Examples of proper and improper bolt connections can be found below.

When connecting to battery terminals, DO NOT finger tighten.
All connections must be tightened to the specifications of the bolt manufacturer. For the bolts included with the battery, tighten using a torque wrench to between 9 and 11 ft-lbs. Failure to adequately secure connections can result in fire and will void your warranty.



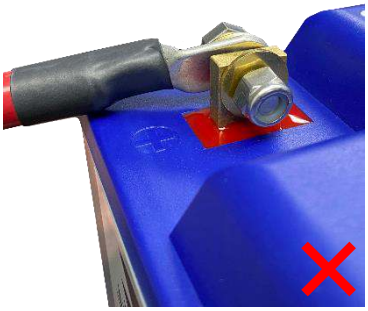
Proper connection for a single lug, top view



Proper connection for a single lug, side view

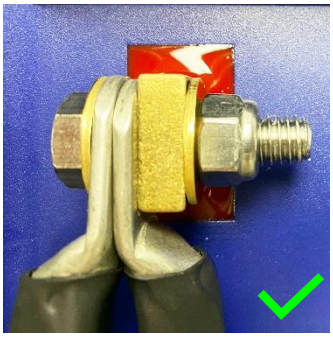
Proper connection: Short bolt is used with one lug so there is no interference with the battery case, and it is fully seated into nylok insert of nut.

Improper connection for a single lug, top view

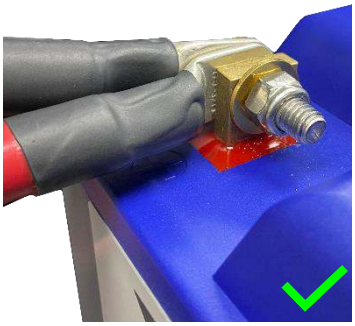


Improper connection for a single lug, side view

Improper connection: Bolt does not fully seat into nylok insert of nut which can create a loose connection and lead to further issues.



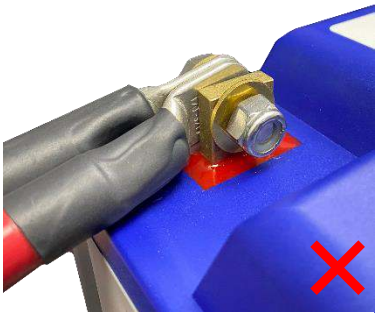
Proper connection for two lugs, top view



Proper connection for two lugs, side view

Proper Connection: Longer bolt used with multiple lugs can fully seat into nylok insert of nut without interfering with battery case.

Improper connection for two lugs, top view



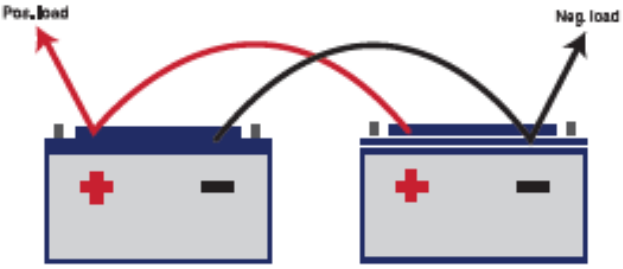
Improper connection for two lugs, side view

Improper Connection: Using multiple connections with a shorter bolt can lead to the nylok insert not being fully seated which creates a bad connection.

Connections

Parallel

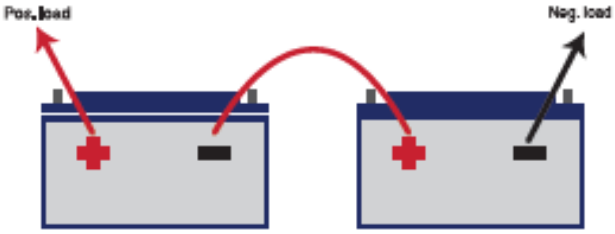
Multiple BB10012(H) may be connected in parallel to increase the current capacity of the system. When batteries are connected in parallel, the voltage of the system does not change, but the capacity and current limits are additive. For example, two BB10012(H) batteries connected in parallel create a 12V 200Ah bank that can deliver 200A continuously and 400A for 30 seconds. Therefore, all cables and connections MUST be able to accommodate the high currents that can be delivered by the battery. Appropriate fuses and circuit breakers are also highly recommended to protect downstream components from current spikes and short circuits.



Parallel Connection 12V 200Ah bank
Increases Ah, Voltage stays the same.

Series

Up to four BB10012(H) batteries may be connected in series to increase the voltage of the system up to a 48V system. **DO NOT** exceed a 48V setup or you will void the batteries warranty. When batteries are connected in series, current capacities remain the same, but the system voltage is additive. Two BB10012(H) batteries connected in series to form a nominally 24V system should be charged using a bulk and absorption voltage of 28.8V, and a float voltage of 27.2V. Three BB10012(H) batteries connected in series to form a nominally 36V system should be charged using a bulk and absorption voltage of 43.2V, and a float voltage below 40.8V. Four BB10012(H) batteries connected in series to form a nominally 48V system should be charged using a bulk and absorption voltage of 57.6V, and a float voltage below 54.4V. Batteries to be connected in series should be at the same state-of-charge before they are connected. For best results, fully charge each BB10012(H) battery using a 12V charger prior to connecting them in series, **in order to ensure that they are at the same state-of-charge**.



Series Connection 24V 100Ah bank
Increases Voltage, Ah stays the same.

Cables

When considering cable sizing there are a few factors to consider. First, what is the size of the load you are powering with the battery bank? Second, how far away from the battery is the load? You can do voltage drop calculations to see if you need to step up your cable size.

Amperes	0-4 ft.	4-7 ft.	7-10 ft.	10-13 ft.	13-16 ft.	16-19 ft.	19-22 ft.
250-300	4-ga.	2-ga.	2-ga.	1/0-ga.	1/0-ga.	1/0-ga.	2/0-ga.
200-250	4-ga.	4-ga.	2-ga.	2-ga.	1/0-ga.	1/0-ga.	1/0-ga.
150-200	6 or 4-ga.	4-ga.	4-ga.	2-ga.	2-ga.	1/0-ga.	1/0-ga.
125-150	8-ga.	6 or 4-ga.	4-ga.	4-ga.	2-ga.	2-ga.	2-ga.
105-125	8-ga.	8-ga.	6 or 4-ga.	4-ga.	4-ga.	4-ga.	2-ga.
85-105	8-ga.	8-ga.	6 or 4-ga.	4-ga.	4-ga.	4-ga.	4-ga.
65-85	10-ga.	8-ga.	8-ga.	6 or 4-ga.	4-ga.	4-ga.	4-ga.
50-65	10-ga.	10-ga.	8-ga.	8-ga.	6 or 4-ga.	6 or 4-ga.	4-ga.
35-50	10-ga.	10-ga.	10-ga.	8-ga.	8-ga.	8-ga.	6 or 4-ga.
20-35	12-ga.	10-ga.	10-ga.	10-ga.	10-ga.	8-ga.	8-ga.
0-20	12-ga.	12-ga.	12-ga.	12-ga.	10-ga.	10-ga.	10-ga.

Length in Feet

As a rule of thumb, you can use these numbers as a guideline.

Fuses

ANL fuses are designed to melt and separate into two pieces for the purpose of breaking a circuit in the event of excessive current. These fuses are essential components protecting against a catastrophic event and are typically placed between Battle Born Batteries and the inverter.
For more information on fuse sizing, please visit our website.

Storage

We recommend bringing the Battle Born Batteries to 100% state of charge. Then, disconnect the battery from any load by removing the negative cable from one battery. Doing this can result in your batteries only losing 3-5% of stored energy a month.

Maintenance

Battle Born Batteries require very little maintenance. If your batteries are in series and not being charged by a multi-bank charger it is recommended that you fully charge the batteries individually once a year. This will balance out the entire battery bank to ensure the batteries will reach its expected life span. If your batteries are in parallel this is not necessary, just make sure the batteries are charged to 14.2V – 14.6V for balance. Our BMS has a built-in passive balancing system that will take care of this for you.

Warranty

Dragonfly Energy Corp. (“the Manufacturer”) warrants each Dragonfly Energy and Battle Born Batteries branded Li-ion battery (“the Product”) sold by Dragonfly Energy, Battle Born Batteries, or any of its authorized distributors or dealers, to be free of defects for a period of 10 years (“the Warranty Period”) from the date of sale as determined by either the customer’s sale receipt, the shipping invoice and the battery serial number, with proof of purchase. Within the first 8 years of the Warranty Period, subject to the exclusions listed below, the Manufacturer will credit, replace or repair, if serviceable, the Product and/or parts of the Product, if the components in question are determined to be defective in material or workmanship. After 8 years and up to 10 years, if the components in question are determined to be defective in material or workmanship, and the Manufacturer deems the components to be repairable, the Product will be repaired and returned. If the Manufacturer deems the components to be not repairable, a new, similar Product will be offered at a discount of 30% off of the price listed at the time of the offer. The offer will be valid for a period of 30 days after the date of notification. See https://battlebornbatteries.com/terms-conditions/#warranty for the full warranty policy.

NON-TRANSFERABLE

This Limited Warranty is to the original purchaser of the Product and is not transferable to any other person or entity. Please contact the place of purchase regarding any warranty claim.

WARRANTY EXCLUSIONS

The Manufacturer has no obligation under this Limited Warranty for Product subjected to the following conditions (including but not limited to):

- Damage due to improper installation; loose terminal connections, under-sized cabling, incorrect connections (series and parallel) for desired voltage and AH requirements, or reverse polarity connections.
- Environmental damage; inappropriate storage conditions as defined by the Manufacturer; exposure to extreme hot or cold temperatures, fire or freezing, or water damage.
- Damage caused by collision.
- Damage due to improper maintenance, under- or over-charging the Product, dirty terminal connections.
- Product that has been opened, modified, or tampered with.
- Product that was used for applications other than which it was designed and intended for, including repeated engine starting.
- Product that was used on an over-sized inverter/charger (any inverter/charger that is rated to 3500 Watts or greater) without the use of a Manufacturer-approved current surge limiting device.
- Product that was under-sized for the application, including an Air Conditioner or similar device having a locked rotor startup up current that is not used in conjunction with a Manufacturer-approved surge-limiting device.
- Product not stored in adherence to the Manufacturer's storage guidelines, including storage of the Product at low state-of-charge.
- This Limited Warranty does not cover a Product that has reached its normal end of life due to usage which may occur prior to the Warranty Period. A battery can deliver only a fixed amount of Energy over its life which will occur over different periods of time depending on the application. The Manufacturer reserves the right to deny a warranty claim if the Product is determined, upon inspection, to be at its normal end of life even if within the Warranty Period.

Please see https://battlebornbatteries.com/terms-conditions/#warranty for the **full** warranty policy.

WARRANTY DISCLAIMER

This limited warranty is in lieu of, and manufacturer disclaims and excludes, all other express warranties. Manufacturer further limits the duration of all, whether statutory, express, or implied warranties, including, without limitation, any warranty of merchantability or fitness for a particular purpose, to the warranty period. Manufacturer's exclusive liability for breach of any warranty on the Battery shall be to replace the Battery within the warranty period in accordance with the terms of this limited warranty. In no event shall Manufacturer be liable for any loss or damages of any other kind, whether direct, incidental, consequential including lost profits, exemplary, special, or otherwise, including any lost profits or removal, shipping, or installation expenses.

EXCEPT FOR THE WARRANTY SET FORTH ABOVE, SELLER MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE GOODS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; OR (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.

LEGAL RIGHTS

Some countries and/or states do not allow limitation on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, which may vary from country to country and/or state to state. This warranty shall be governed by and interpreted in accordance with the laws of Nevada. This warranty is understood to be the exclusive agreement between the parties relating to the subject matter hereof. No employee or representative of Manufacturer is authorized to make any warranty in addition to those made in this agreement.

NON-DRAGONFLY ENERGY WARRANTIES

This Limited Warranty does not cover Product sold by the Manufacturer or any authorized distributor or dealer to an Original Equipment Manufacturer ("OEM"). Please contact the OEM directly for warranty claims regarding such Product.

NON-WARRANTY REPAIRS

If outside of the Warranty period or for damage not covered under the Warranty, customers may still contact the Manufacturer for battery repairs. Costs will include, shipping, parts, and $50 per hour for labor.

SUBMITTING A WARRANTY CLAIM

To submit a warranty claim, please contact the original place of purchase if you did not purchase through Battle Born Batteries. The Product may be required to be shipped back to the Manufacturer for further inspection.

Return Policy

You have 30 calendar days to return an item from the date the item shipped. To be eligible for a return, your item must be in the same condition that you received it in. Your item must be in the original packaging, you must have the receipt or proof of purchase. Returns will not be accepted without an RMA number, which can be obtained by filling out the return form at https://battlebornbatteries.com/returns/. To avoid being charged restocking fees, review the full return/refund policy at https://battlebornbatteries.com/terms-conditions/#returns.

Refund Policy

You have 30 calendar days to return an item from the date the item shipped. Once we receive your item, we will inspect it and notify you that we have received your returned item. We will immediately notify you on the status of your refund after inspecting the item. If your return is approved, we will initiate a refund to your credit card (or original method of payment). You will receive the credit within a certain amount of days, depending on your card issuer's policies. No refund is guaranteed after the initial 30 days has passed or if the item has been used.

Shipping

You will be responsible for paying for your own shipping costs for returning your item if you are returning **after** 30 days from the original ship date. Shipping costs are nonrefundable. If you receive a refund, the cost of return shipping will be deducted from your refund.

If you have any please contact us by calling 855-292-2831 or email us at info@battlebornbatteries.com.