DuraComm® POWER SUPPLIES
A Benny Lee Company

PRODUCT USER GUIDE

BC-27-15-LFP

24 V Battery Charger for LiFePo Batteries with Internal BMS

Owners Guide

(These instructions are intended for use by a technician familiar with electronic products)

- 108-132 VAC, 47-63 Hz
- Installed IQ4-LIFEPO Smart Charge control module
- **NOTE: For Charging 24 V LiFePo Batteries with internal BMS Only!**
- Filtered & Regulated
- Automatic shutdown on low AC voltage
- LED diagnostic indicators on IQ4 models
- Forced Air Cooling
- Fused Output
- UL Listed
- 3 year warranty

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DESCRIPTION

The BC-27-15-LFP power Converter/Battery Charger converts 108-132 VAC voltage to a Bulk Charge or Float Charge voltage for LiFePo 24 V battery charging. **The BC-27-15-LFP is for charging LiFePo batteries with an internal BMS controller only. It is not for charging unprotected LiFePo batteries or any other type of battery.**

As a battery charger with IQ4 LIFEPO control module, the unit will maintain the battery, delivering its full-rated current when the battery capacity falls sufficiently low. The voltage is set to deliver its maximum current for the necessary period of time to minimize stress to the battery caused by heating of its cells. This helps to ensure the longest possible life of the battery. Over time, as the battery nears its full capacity, the BC-27-15-LFP will automatically drop the current, providing a float-charge to the battery to prevent self-discharge of the cells.

SPECIFICATIONS

Output Voltage (Bulk Charge) Max	29.4 VDC
Output Voltage (Float Charge)	27.2 VDC
Output Voltage Tolerance (No Load)	+/– 0.5%
Output Amperage, Max continuous	15 Amps
Maximum Power Output, Continuous	400 Watts
Ripple and Noise	<100mV rms
Input Voltage Range	108-132 VAC
Input Voltage Frequency	47-63 Hz
Max AC current @108 VAC	7.3 Amps
Typical Efficiency	>80%
Max Inrush Current, Single Cycle	30 Amps
Short Circuit Protection	Yes
Overload Protection	>100%
Line Regulation	100 mV rms
Load Regulation	<1%
Fan Control	Proportional
Thermal Protection	Yes
Working Temperature range	+32 F to +104 F (0 C to +40 C)
Storage Temperature	-4 to +176 F (-20 to +80 C)
Withstand Voltage (VDC)	1700/1700/500
Size	9.7” D x 6.7” W x 3.4” H
Weight	5 Lbs

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INSTALLATION WARNING

NOTE: The IQ-LIFEPO is for use with batteries with Battery Management Systems (BMS) only. Not for use with unprotected LiFePa4 batteries.

ATTENTION: While the IQ-LIFEPO is designed to accommodate most LiFePo battery and BMS systems, always refer to the manufacturer's specifications for your batteries allowable charging parameters.

DO NOT block any opening in the case or operate the unit in a hot, enclosed environment or compartment. Be sure adequate ventilation is provided since heat buildup will shorten component life. Note: Most audio and radio equipment draws much less average current than peak demand.

If the unit stops working, check all the connections for tightness and check all the external wiring to the radio or other devices connected to the power supply.

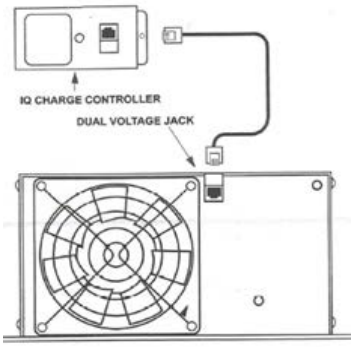
If the power supply stops repeatedly, verify the equipment connected does not exceed the power supply ratings. If the problem persists, have the unit checked by a qualified technician.

INSTALLATION NOTES

The IQ-LiFePo comes pre-installed on a DPS series power supply. It must be installed before connecting to the LiFePo battery.

Note: the cord provided is specifically de- signed for use with the IQ-LIFEPO. Do not use the IQ-LIFEPO with any cord other than one supplied with the unit.

Location of the Dual Voltage Jack may vary depending on the DLS Model.



The DPS series power supplies have a thermostatically controlled fan system. It can be installed in any position. However, the best mounting position for the DPS series is vertical with the output terminals up. This position provides the most effective cooling for the unit. Leave at least one inch (1") clearance on each end and side/top. When the internal or ambient temperature exceeds 45°C (115°F), the cooling fan is activated. Mount the unit through the holes provided.

Connect your equipment to the positive (+) and negative (-) DC output terminals. Be certain you connect positive to positive and negative to negative. Insert the AC plug into an AC outlet of the proper voltage. If the unit fails to operate, recheck the equipment installation, hookup polarity, and the AC outlet.

The DPS series power supplies are provided with external blade fuses that will act in the case of a catastrophic failure. Do not replace the fuses with a larger or higher amperage-value fuse.

The DC outputs are not connected to the chassis. Thus the power supply can be used with either negative ground or positive ground equipment. In certain circumstances it is desirable to establish a ground / chassis reference at the power supply. To do this, connect a short jumper from the ground (green) terminal to the negative (black) terminal for negative ground. For positive ground connect to the positive (red) terminal.

The DC output voltage adjustment is internal to the power supply. It can be adjusted using a non-conductive 1/8" blade tool. The cover must be removed to adjust the voltage.

CAUTION: Under no circumstances should more than 132 VAC be applied to the input. Permanent damage to the unit could result.

OPERATION

OPERATION AND LED INDICATOR REFERENCE
The LED Indicator on the IQ informs the user of the DLS charging state and the battery charge status. When first activated, the IQ will read the number of cells in the battery and indicate the voltage of the battery through a number of flashes. Refer to Figure C.
LIT/FLASHING LED - After detecting the battery, the IQ-LIFEPO will initiate a Bulk Charge phase. When the IQ-LIFEPO is in the Bulk Charge mode, the green LED indicator will flash rapidly (ap- prox. 2 flashes per second). When the Bulk Charge is complete, the IQ-LIFEPO will begin the Float Charge phase and the LED will remain lit (no flashing). Refer to Figure B for Charge Stage descriptions. The LED indicator will remain lit or flashing when the charger is unplugged or disconnected from the AC supply (de-energized). During this time, the IQ continues to monitor the battery voltage. If the battery voltage drops below a pre-determined voltage (Refer to Figure D for predetermined values), the IQ will automatically initiate the smart-charging cycle once the AC input is re-connected.

IRREGULAR FLASHING LED - If the LED is flashing irregularly or intermittently, then the IQ has entered a FAULT state due to a voltage irregularity. When this occurs, the IQ must be re-set in order to resume normal operation. Refer to the FAULT STATE instructions below for re-setting procedures.

CHARGING STAGE DESCRIPTIONS

BULK STAGE - During this state, the charger will operate either at Full Current output or Constant Voltage output depending on the discharged state of the battery. A discharged battery will dictate the voltage and force the charger into constant-current operation. As the battery charges, the charger transitions to a constant-voltage operation. This BULK STAGE will continue for either 120 minutes or until the battery voltage reaches the "High Trigger" value (whichever occurs first). At this point, the BULK STAGE will operate for another 15 minutes before switching to the FLOAT STAGE.

FLOAT STAGE - This charge state holds the batteries at Constant Voltage for a period not longer than fifteen days. During this state, the charger not only floats the batteries, but it can also provide load current up to its maximum rating for other loads without depleting the battery capacity. The

FLOAT STAGE will end when either the battery voltage drops below the "Low Trigger" point or at the end of 15 days when the IQ-LIFEPO initiates the MAINTENANCE stage to ensure a complete charged condition. In either situation, the unit exits the FLOAT STAGE and enters the BULK STAGE.

FAULT STATE - If the IQ enters a FAULT state, its circuitry is automatically disabled. In this state, the functionality of the IQ is completely disabled, the LED will flash irregularly, and the charger re- verts to a stand-alone FLOAT STATE voltage. The unit will not exit this stand-alone FLOAT STATE; therefore the unit must be reset by following the steps below.

1. Unplug the charger from its AC source.
2. Disconnect the [+] positive cable from the battery.
3. Wait 30 seconds before reconnecting the input and output. To avoid arcing, it is recommended that the charger be connected to the AC input FIRST before connecting the output of the charger to the battery*.

*Note that the connection sequence of the input and output covered above is recommended every time an operator connects the charger to the batteries. However, as long as the charger remains connected to the battery, periodic unplugging of the AC input does not require this sequence.

Figure D: Predetermined Stage Trigger Values

PREDETERMINED VARIABLES FOR OPERATION				
Battery Voltage	BULK	FLOAT	LOW TRIGGER	HIGH TRIGGER
24V	29.4V	27.2V	25.6V	29.2V

NOTE: The IQ-LIFEPO is for use with batteries with Battery Management Systems (BMS) only. Not for use with unprotected LiFePo4 batteries.

SPECIAL NOTE

DuraComm power supplies are accurately regulated to maintain constant output voltage from no load to near full load. Above the rated output load, the current limiting circuit begins to act, reducing the output voltage to prevent unit overload damage. Some loads, like incandescent lamps, will have start-up current loads that are up to ten times the normal "hot" current drain. To ensure the DuraComm power supply will not encounter current limiting shutdown; only operate incandescent loads that are about one-half to two-thirds of the maximum continuous current rating.

CONDUCTOR PRETREATMENT

All kinds of copper conductors can be clamped without treatment. DO NOT solder tin stranded conductors. The solder yields and fractures under high pressure. The result is increased contact resistance and excessive temperature rise. Additionally, corrosion has been observed due to the fluxes. Notch fractures at the transition from the rigid tinned part to the flexible conductors are also possible. Ferrules can be used as a protection when wiring stranded conductors. Copper ferrules prevent the current transfer from being influenced by dissimilar metals and remove the risk of corrosion. Always use the correct tool to crimp the ferrule.

RECOMMENDED COPPER WIRE SIZE FOR CURRENT CAPACITY

(Insulated Wire, Single Conductor in free air)

Current Level in Amperes	***Wire Size***
<7 AMPERES	*20 AWG Up to 5 feet* *18 AWG Up to 10 feet*
14 AMPERES	*18 AWG Up to 5 feet* *16 AWG Up to 10 feet*
20 AMPERES	*16 AWG Up to 5 feet* *14 AWG Up to 10 feet*
30 AMPERES	*14 AWG Up to 5 feet* *12 AWG Up to 10 feet*
40 AMPERES	*12 AWG Up to 5 feet* *10 AWG Up to 10 feet*
50 AMPERES	*10 AWG Up to 5 feet* *8 AWG Up to 10 feet*
70 AMPERES	*8 AWG Up to 5 feet* *6 AWG Up to 10 feet*
100 AMPERES	*6 AWG Up to 5 feet* *4 AWG Up to 10 feet*

LIMITED WARRANTY

DuraComm warrants to the initial end user, each power supply manufactured by DuraComm to be free from defects in material and workmanship, when in normal use and service for a period of three years from the date of purchase, from an authorized DuraComm dealer.

Should a product manufactured by DuraComm fail or malfunction due to manufacturing defect, or faulty component, DuraComm, at its option, will repair or replace the faulty product or parts thereof, which, after examination by DuraComm, prove to be defective or not operational according to specifications in effect at the time of sale to the initial end user. The product that is replaced or repaired under the provisions of this warranty, will be warranted for the remainder of the original warranty period, only, and will not extend into a new three year warranty period.

The limited warranty does not extend to any DuraComm product which has been subject to misuse, accidental damage, neglect, incorrect wiring not associated with manufacture, improper charging voltages, or any product which has had the serial number removed, altered, defaced, or changed in any way.

DuraComm reserves the right to change, alter, or improve the specifications of its products at any time, and by so doing, incurs no obligation to install or retrofit any such changes or improvements in or on products manufactured prior to inclusion of such changes.

DuraComm requires any product needing in or out of warranty service to be returned to DuraComm. All requests for warranty service must be accompanied by proof of purchase, such as bill of sale with purchase date identified. DuraComm is not responsible for any expenses or payments incurred for the removal of the product from its place of use, transportation or shipping expenses to the place of repair, or return expenses of a repaired or replacement product to its place of use.

The implied warranties which the law imposes on the sale of this product are expressly LIMITED, in duration, to the three (3) year time period specified herein. DuraComm will not be liable for damages, consequential or otherwise, resulting from the use and operation of this product, or from the breach of this LIMITED WARRANTY.

Some states do not allow limitations on the duration of the implied warranty or exclusions or limitations of incidental or consequential damages, so said limitations or exclusions may not apply to you. This warranty gives you specific legal rights which vary from state to state.

This warranty is given in lieu of all other warranties, whether expressed, implied, or by law. All other warranties, including WITHOUT LIMITATION, warranties of merchantability and fitness or suitability for a particular purpose, are specifically excluded. DuraComm reserves the right to change or modify its warranty and service programs without prior notice.

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