BLUESHAPE®

Energy inside

INTELLIGENT BATTERY CHARGER

FOR B-MOUNT LITHIUM-ION BATTERIES ONLY

Model:

CBTR2P - SIMULTANEOUS

OPERATING MANUAL

Revision 3.0
www.blueshape.net

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Read all instructions and cautionary markings in this manual and on the charger before using this product. Adhere to these instructions to prevent misuse of the products and possible injury or damage to property.

Keep these instructions. This manual contains important safety and operating instructions for the charger.

Explanation of symbols used in this manual



This symbol indicates the presence of an electrical shock hazard. It is intended to avert users not to open the product as there are no user serviceable parts inside. Any form of servicing should be done by qualified service personnel only.



This symbol is intended to alert the user to important operating, servicing and maintenance instructions within this product manual.



This symbol is intended to alert the user to the presence of uninsulated and potentially dangerous voltage within the product's enclosure that may be of sufficient strength to constitute a risk of electric shock to persons.

The contents in this operating manual are subject to change without notice.

General Safety Instructions



This equipment must be earthed.



Do not dismantle the charger. There are no user-serviceable parts inside. Always refer servicing to qualified personnel.

BLUESHAPE CHARGERS ARE INTENDED FOR OPERATION WITH LINE VOLTAGES BETWEEN 100V AND 264V AC AND LINE FREQUENCIES BETWEEN 43 Hz AND 60 Hz



To prevent fire or shock hazard do not expose the unit to rain or moisture.



The equipment is being supplied with a compatible AC mains power cord. In the case when the UK Plug is fitted, this plug is equipped with a 13A replaceable fuse. Damage to the power cord can lead to electric shock.



The user is being alerted of the importance of going through the literature accompanying this product and familiarising himself with the important safety and operating instructions.



When using electric appliances, basic precautions should always be followed including the following:

- Only use attachments recommended or sold by manufacturer.
- To reduce the risk of injury, close supervision is necessary when an appliance is used near children.
- Do not use the charger outdoors or expose it to wet or damp conditions. Water entering the charger will increase the risk of electric shock.
- Do not misuse the cord or charger. Never use the cord to carry the charger. Do not pull the charger cord to disconnect the plug from a receptacle. Damage to the cord or charger could occur and create an electric shock hazard. Replace damaged cords immediately.
- Do not operate the charger with a damaged cord or plug, which could cause shorting and electric shock.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- For a portable appliance, to reduce the risk of electrical shock, do not submerge charger in water or other liquid. Do not place or store appliance where it can fall or be pulled into a tub or sink.

Usage and Handling Safety Instructions



Charge only lithium-ion rechargeable batteries as specifically designated on your charger's label. Other types of batteries may burst, causing personal injury or damage.

BLUESHAPE lithium-ion battery chargers have been designed to provide a superior performance by managing relatively high currents during their operation in order to reduce charging time. As may be expected, the chargers become warm during operation.



The charger is also equipped with over-temperature protection. Please consult your BLUESHAPE dealer if you notice that either a charger or a battery has become excessively hot during the charging operation.

Keep ventilation openings unobstructed to allow adequate airflow through the device.

Never insert any metallic or any objects inside the equipment through the ventilation openings or otherwise.

- Do not handle charger, including the charger plug and charger terminals with wet or damp hands.
- Use of an attachment not recommended or sold by the battery-charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
- Make sure that the cord is located so that it will not be stepped on, tripped over, come in contact with sharp edges or moving parts, or otherwise be subjected to damage or stress. This will reduce the risk of accidental falls, which could cause injury and damage to the cord, which could then result in electric shock.
- Do not operate the charger if it has received a sharp blow, been dropped, or has otherwise been damaged in any way. Take it to an authorized service technician for an electrical check to determine if the charger is in good working order.
- Do not disassemble the charger. Take it to an authorized service technician when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- Unplug the charger from the electrical outlet before attempting any maintenance or cleaning to reduce the risk of electric shock.
- Do not abuse the cord or charger. Never use the cord to carry the charger. Do not pull the charger cord to disconnect the plug from a receptacle. Damage to the cord or charger could occur and create an electric shock hazard. Replace damaged cords immediately.

– Disconnect charger from the power supply when not in use. This will reduce the risk of electric shock or damage to the charger if metal items should fall into the opening. It will also help prevent damage to the charger during a power surge.

– Do not touch the uninsulated portion of output connector or uninsulated battery terminal.

– Recharge battery packs only with the charger specified by the manufacturer. A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.

– Keep the cord and charger away from heat to prevent damage to housing or internal parts.

– Do not allow gasoline, oils, petroleum-based products, etc. to come in contact with plastic parts. These materials contain chemicals that can damage, weaken, or destroy plastic.

CBTR2P Package Contents

This device package contains the following:

- CBTR2P simultaneous dual position charger

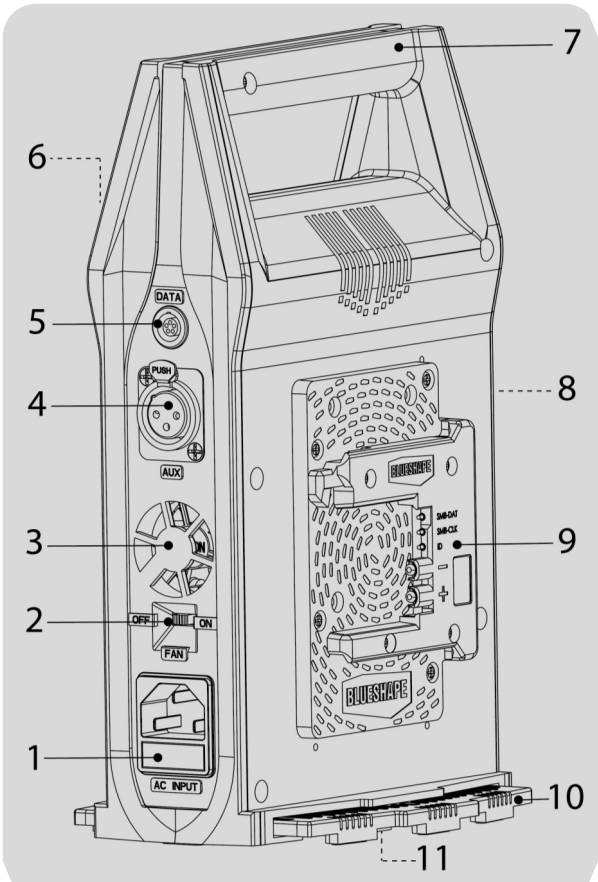
- AC Power Cord [according to region]

  Device-End Connector: IEC 60320 C13
  EU Plug: IEC 884/CEE7-VII3
  UK Plug: BS1363A w/13A FUSE
  US Plug: NEMA 5-15-P

  - CORDAGE: H05VV-F, 3 x 1.0mm, UNSHIELDED
    CEE COLOR CODE, TEMP. RATING 60°C
    RATING: 250V 10A
    JACKET COLOR: BLACK

- Operating Manual

Graphic Description



1. Mains socket (with fuse)
2. Fan switch (ON/OFF)
3. Cooling fan outlet
4. Aux output connector (28.8V 115W) 3-pin XLR
5. Data socket
6. B-Mount Plate (Battery installation bay #2)
7. Carrying Handle
8. LEDs (Bat #1, AC on/off, Bat #2)
9. B-Mount Plate (Battery installation bay #1)
10. Extending foot support
11. Extending foot push button

Introduction

The BLUESHAPE series of intelligent lithium-ion battery chargers have been specifically designed for fast and reliable charging of BLUESHAPE batteries with the B-Mount standard and 28V nominal voltage. The charging speed depends on the type of batteries on charge since the charger communicates and acquires information from the batteries during operation. The charger is capable of delivering up to a maximum of 3Amps ~ 100W in constant current (CC) mode on the two channels simultaneously. This makes it ideal for fast turnaround, especially when using higher capacity batteries. However, when charging smaller batteries, the charger never exceeds currents higher than 0.5C* to avoid overheating and stress to the lithium-ion cells.

Nevertheless, these chargers can also charge 3rd party, B-Mount batteries with 28V nominal voltage only. In case a battery does not communicate with the B-Mount standard, the charge is applied at a fixed rate of 2A when fan is ON and 1.5A when fan is OFF. A precaution is included by design in order not to overcharge 3rd party batteries or render them unsafe.

For the users' convenience, the external dimensions have been kept as compact as possible for better portability.

*0.5C is equivalent to half the battery Ah capacity

Features of CBTR2P

- Elegant and robust design. Ideal for regular daily use.
- Sophisticated electronics for accurately detecting the charging requirements and applying the correct charging rate accordingly.
- Switchable fan for selection of 'FAST' or 'SILENT' charging modes.
- Simultaneous charging of 2 batteries at a maximum of 3A ~ 100W each when fan is switched on.
- Three-colour LED indicators for individual charge-station monitoring.
- LED for 'AC on' indication. No power switch has been provided.
- Pre-charge function for protecting heavily discharged cells against high currents until their voltages rise to a safe level.
- Precise constant current (CC) and constant voltage (CV) charging algorithms to match the battery programmed charging voltage

- Maximum compactness and space utilisation. Extendable, spring loaded support foot for excellent stability even when there is just 1 large battery installed. The foot extension is activated by pressing a push button underneath the charger.
- Powerful auxiliary output at a nominal 28.8V / 115W through a 3-pole XLR.
- Data connector for computer connectivity for debugging and servicing.

Note: The special data cable is not included in the kit but is available as a separate product.
This socket can also be used for firmware updates if necessary.



*The output voltage of the auxiliary output is dependent on the battery voltage. It can therefore range between 25V up to 34V.

BLUESHAPE Battery Charging and Performance Features

The electronic circuitry provides a very accurate lithium-ion charge algorithm. Initially, the chargers will only apply a pre-charge current of a few mA to batteries that are heavily discharged. Once the cells inside the batteries reach a safe level, the full (maximum) charging current is delivered at a maximum rate of 3A (but less than 0.5C) until the batteries reach almost 90% state of charge (SOC).

This charging rate is only applied when the fan is set to ON. If the fan is switched to OFF for silent operation, the charging current is reduced to not exceed 2A (but less than 0.5C).

After the constant current (CC) phase is completed, a constant voltage (CV) phase initiates with the current tapering slowly to 75mA until full cut-off.

CBTR2P Charging Performance with Fan ON			
Approximate charging time per channel (minutes)			
Battery Model	Battery Capacity	CC rate (0.5C)	State of Charge (SOC)%
			100% (mins)
BB145	5Ah - 145Wh	2.5A	150
BB145HS	5Ah - 145Wh	2.5A	150
BB290	10Ah - 290Wh	3A	260
BB435	15Ah - 435Wh	3A	340

CBTR2P Charging Performance with Fan OFF			
Approximate charging time per channel (minutes)			
Battery Model	Battery Capacity	CC rate (0.5C)	State of Charge (SOC)%
			100% (mins)
BB145	5Ah - 145Wh	2A	180
BB145HS	5Ah - 145Wh	2A	180
BB290	10Ah - 290Wh	2A	330
BB435	15Ah - 435Wh	2A	480

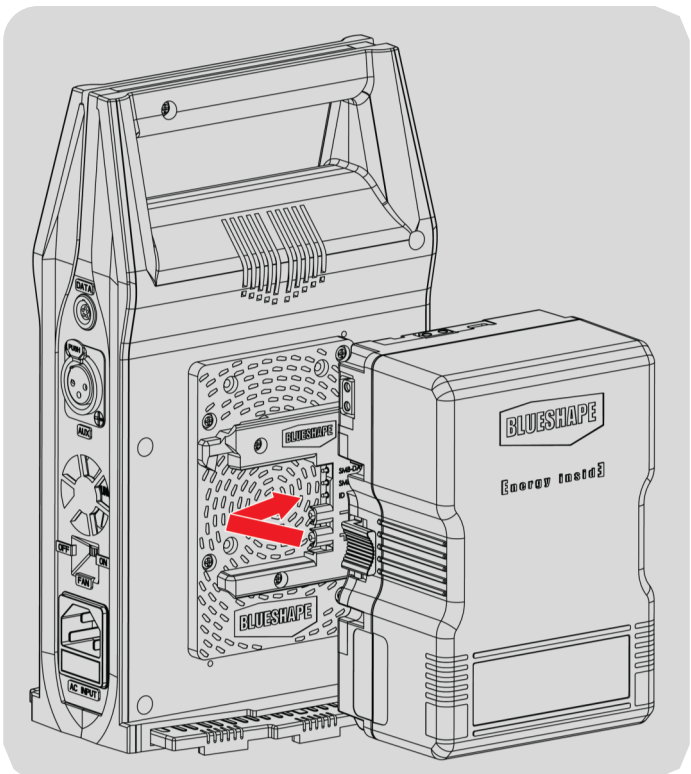
Operating Instructions

This device **simultaneously** charges two batteries with charging currents of up to 3A, depending on the battery capacity.

The Li-ion batteries can be either BLUESHAPE (preferred) or any other 3rd party compatible batteries can be of any capacity.

The charger will automatically select the charging rate to apply.

The batteries are to be inserted in any of the two battery bays as illustrated below.



How to proceed:

- From underneath the charger, push the centre push button to extend the foot support. When not in use, or for transport, the foot support can be pushed back in place.
- The unit has been designed to remain in balance with one or both batteries installed.
- Plug and switch on the AC power cord provided into the charger AC input (note: there is no power switch in the charger). The AC mains LED will change from Red to Green.
- Insert a battery in any one of the two B-Mount Plates as indicated in the illustration on page 10.
- Monitor the battery LED for charge status. The BLUESHAPE battery LED array allows reading the charge status in 10% increments, or for full resolution, utilize the Bluetooth Low Energy (BLE) feature of the battery (refer to the battery operating manual for detailed instructions). Allow the battery to charge for the specified duration as outlined in the table on page 9.
- The battery is fully charged when the LED becomes steady Green

You may want to charge 2 batteries at the same time. Just insert the second battery into the second B-Mount Plate. This second battery will start charging immediately and at the correct rate according to its capacity.

The LEDs will accurately display the correct status of the charging process for each battery.

Using the Charger as an Auxiliary Power Supply

In the case when a device is plugged into the auxiliary XLR port, the charging process may continue but can be slowed down, depending on the power taken by the AUX port that has the priority.

The AUX port is only available whenever AC is connected.

Working with AC Input

When AC is present and no batteries are installed, the power available on the AUX port depends on the fan state:

- with fan set ON - 28.8V regulated at max 3A
- with fan set OFF - 28.8V regulated at max 2A

Note: Drawing power from the auxiliary whilst charging a battery will increase charging time as the available current is shared between the battery on charge and the load on the AUX port.

See the technical specifications table in this manual to understand the different current handling under different conditions.

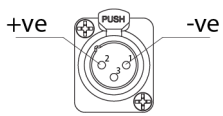
Working without AC Input

Due to the nature of the B-Mount standard the batteries cannot release power when installed on a charger without AC connected. Thus AUX will not work when AC is off.

Battery LED Indications

	LED	Indication	Description
1	AC	Steady Red	There is no AC present
		Steady Green	There is AC present
2	Bat #1 or Bat #2	Steady Green	Battery is full
3	Bat #1 or Bat #2	Flashing Green	Channel is idle and ready to charge and/or supply AUX
4	Bat #1 or Bat #2	Flashing Orange	The battery is in charge and is charging at less than 1000mA. Two possible conditions: 1. The battery is in pre-charge mode because of low voltage, and is limiting the charging current. 2. Battery is in Pre-charge phase
5	Bat #1 or Bat #2	Steady Orange	Battery is in constant current (CC) phase
6	Bat #1 or Bat #2	Flashing Orange-Green	Battery is in constant voltage (CV) and has just reached the ~90% of capacity, and is completing the charge
7	Bat #1 or Bat #2	Flashing Red	Premature charge termination - the battery stopped before it was supposed to. This may be due to the battery not enabled to charge for a temporary condition. The charger will keep retrying every 30 seconds for approximately 2 hours.
8	Bat #1 or Bat #2	Steady Red	Battery failure: several causes. The battery should have charged but did not after 2 hours of retrying because of an internal failure. The battery ID resistor is incorrect and not recognised. (applicable range is 10K<ID<60K)
9	Bat #1 or Bat #2	Flashing Red	All the 3 LEDs flashing together. Operation halted because charger has overheated. The charger will automatically resume operation when it cools down .

Technical specifications

Type	Li-ion constant current and voltage control system	
CC-MODE: Output with B-Mount Communications	Max 3000mA ± 5% with fan ON Max 2000mA ± 5% with fan OFF	
CC-MODE: Output with No Communications	Max 2000mA ± 5% with fan ON Max 1500mA ± 5% with fan OFF	
CC-MODE: Vmax with B-Mount Communications	Max 33600 ± 50mV (0.15%) regulated based on battery programmed charging voltage	
CC-MODE: Vmax with No Communications	33400 ± 50mV (0.15%)	
CV-MODE: Vmax with B-Mount Communications	Max 33600 ± 50mV (0.15%) regulated based on battery programmed charging voltage	
CV-MODE: Vmax with No Communications	33400 ± 50mV (0.15%)	
CV-MODE: Cut-off current	2% of full capacity	
Auxiliary power (XLR 3 pin)	With no battery: Fan state ON: regulated 28.8V @ 5A max ± 5% Fan state OFF: regulated 28.8V @ 4A max ± 5%	
XLR Polarity (3 pin)		Pin 1: -ve Pin 2: +ve Pin 3: nc
Short circuit protection	Available	
Overcharge protection	Available	
Overtemperature protection	Available	
Special features	Charging current and voltage regulated according to battery capacity for BLUESHAPE or compatible batteries only	
Power supply	AC mains 100V - 264V ~ universal,47 - 63 Hz, 1000W	
Fuse	1 x 250V-2.5A + 1 spare	
Power consumption	225W Max	
Power factor	>0.94 at full load	
Operating temperature range	0°C - 45°C	
Storage temperature range	-20°C - 65°C (-4°F - 149°F)	
Dimensions	260 x 150 x 85mm (10.2" x 5.9" x 3.3")	
Weight	1.25Kg (2.76lbs)	

Notes Concerning Charger Usage with BLUESHAPE Battery Packs

It is recommended that the users always have at least another spare battery readily available.

It is preferable to charge batteries immediately before use.

Some self-discharge would result if the batteries are charged several weeks in advance of their use. However, this slight loss can be re-charged at any time without any degradation of battery performance (no memory effect).

Do not leave B-mount batteries installed on a charger if inactive for a long period of time because this will create an unnecessary power leakage.

It is recommended to store batteries in a cool and dry place. Charging should be done at temperatures above 0°C and below 45° C.

Slight heating of the battery is expected to occur during charge.

If for some reason, the pack temperature reaches 60°C, then the charge activity is suspended.

The pack resumes normal charging once the temperature drops back to below 50°C. This is a safety feature incorporated in all BLUESHAPE battery packs.

The contents of this operating manual are subject to change without notice.

Disposal Instructions

When the equipment has reached the end of its life please dispose of the components in accordance with your local waste directive in your country.

Electronic equipment should be recycled wherever possible and not disposed of with regular waste.

Warranty

BLUESHAPE chargers are warranted to be free from defects in materials, workmanship and functionality for a period of 18 months commencing from the date of purchase.

This warranty shall not apply to any products or parts of, that have been subjected to misuse, negligence, accidental or abnormal conditions of operation.

The buyer should always contact the place of purchase for any return of defective product. It is important that the buyer provides us with as much information as possible about the failure being claimed.

In the event of product failure for which warranty applies, we will repair or replace the product free of charge. In these cases, all expenses including transport charges will be borne by us.

In the case where the failure has been caused by one of the causes explained above, repairs should be billed at a nominal cost. Prior to the carrying out of any repairs, we will inform the customer of the estimated costs of these repairs.

These warranty conditions are the only ones applicable to our products and overrule any other expressed or implied warranties. We shall not be held liable for any damages resulting from warranty statements other than those contained in this declaration.

This warranty is not transferable and is only applicable to the original buyer. In all warranty claims, the buyer must reproduce the original purchase invoice.



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is a registered trademark of:

NEW CELL TOP Srl
Via Liguria 4-6,
42124 Reggio Emilia, ITALY
TEL.: +39 0522 518556
WEB: www.blueshape.net
EMAIL: info@blueshape.net