



INTELLIGENT BATTERY CHARGER

FOR V-LOCK LITHIUM ION BATTERIES ONLY

Model

CVTR2P - SIMULTANEOUS

OPERATING INSTRUCTIONS

Revision 1.1

Explanation of symbols used in this manual:



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



This symbol is intended to alert the user to the presence of 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.

Please read these instructions concerning your safety

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 and it is therefore very important to keep their ventilation openings unobstructed.



To reduce the risk of electric shock or damage to the charger and battery, charge only those lithium-ion rechargeable batteries specifically designated on your charger's label. Other types of batteries may burst, causing personal injury or damage.

- Do not handle charger, including the charger plug and charger terminals with wet hands.
- 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.
- 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.
- 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.
- 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.
- 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 with a damaged cord or plug, which could cause shorting and electric shock. If damaged, have the charger repaired or replaced by an authorized BLUESHAPE repair service centre.
- 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.
- 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.



Before using the battery charger, read all instructions and cautionary markings in this manual and on the battery charger, the battery and the product using the battery to prevent misuse of the products and possible injury or damage.

- Recharge 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.
- Save these instructions. Refer to them frequently and use them to instruct others who may use this tool. If you lend this tool to someone else, also lend these instructions to them to prevent misuse of the product and possible injury.

IMPORTANT SAFETY INSTRUCTIONS

- Save these instructions. This manual contains important safety and operating instructions for the CVTR2P charger.
- Before using the battery charger, read all instructions and cautionary markings on the battery charger, the battery and the product using the battery.



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

- To reduce the risk of injury, close supervision is necessary when an appliance is used near children.
- Only use attachments recommended or sold by manufacturer.
- Do not use outdoors.
- For a portable appliance, to reduce the risk of electrical shock, do not put charger in water or other liquid. Do not place or store appliance where it can fall or be pulled into a tub or sink.



To reduce the risk of injury, charge only lithium-ion rechargeable batteries. Other types or different chemistry batteries may burst, causing personal injury or damage.

WARNING

THIS EQUIPMENT MUST BE EARTHED.



**TO PREVENT FIRE OR SHOCK HAZARD
DO NOT EXPOSE THE UNIT TO RAIN OR
MOISTURE.**

**TO AVOID ELECTRIC SHOCK, DO NOT OPEN THE
APPARATUS AND ALWAYS REFER ANY SERVICING TO
QUALIFIED PERSONNEL.**



Chargers and/or batteries may become hot during charging. This is normal. The charger is also equipped with over-temperature protection. Please consult your BLUESHAPE dealer if you notice that either a charger or a battery become excessively hot during the charging operation.

Be careful not to block the equipment's ventilation outlets or the fan inlet.

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

BLUESHAPE CHARGERS ARE INTENDED FOR OPERATION WITH LINE VOLTAGES BETWEEN 100V AND 240V AC AND LINE FREQUENCIES BETWEEN 47Hz AND 63 Hz.



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 an electric shock.

Package contents

- CVTR2P simultaneous dual position charger with Aux output
- AC power cord [according to region]
CORDAGE: H05VV-F, 3 x 1.0mm, UNSHIELDED
CEE COLOR CODE, TEMP. RATING 60°C
RATING: 250V 10A
JACKET COLOR: BLACK
CONNECTOR: IEC 60320 C13

EU:
EU PLUG: IEC 884/CEE7-VII3

UK:
UK PLUG: BS1363A W/13A FUSE

US:
US PLUG: NEMA 5-15-P
- Instruction manual including safety operating instructions

CVTR2P graphic description



1. Mains socket with fuse
2. Fan switch (on/off)
3. Cooling fan outlet
4. Auxiliary power XLR 4pin
5. Data socket (for computer connectivity and FW upgrades if needed)
6. V-Lock battery #2 installation bay
7. Carrying handle
8. LEDs (Bat #1, AC on/off, Bat #2)
9. V-Lock battery #1 installation bay
10. Battery release button
11. Extending foot support on both sides
12. Foot extender push button

Introduction

The BLUESHAPE CVTR2P intelligent lithium ion battery chargers have been specifically designed and optimized for fast, safe and reliable charging of BLUESHAPE batteries. The charging speed depends on the type of batteries on charge since the charger communicates and acquires information from the batteries during operation. The CVTR2P is capable of delivering up to a maximum of 6 Amps in constant current (CC) mode on both 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, non-communicative batteries but at a fixed rate. 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

Properties of the CVTR2P

- Modern, original but 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 6A each battery when fan is switched to '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 14.5V* through a 4-pole XLR. The auxiliary output is available if AC is connected or if a battery with terminal voltage >12.5V is inserted in any channel.

- If AC mains is not present or is suddenly cut off, the AUX power is drawn from the batteries and the equipment operates like a UPS and continues delivering power.
- If the battery is placed on charge, the AUX power will be derived from both mains and battery if necessary.
- Data connector for computer connectivity and monitoring of BLUESHAPE batteries through BSCVMON free software, directly downloadable from our website.

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 12.5V up to 17V.

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 6A (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 3.5A (but less than 0.5C - see table).

After the constant current (CC) phase is completed, a constant voltage (CV) phase initiates with the current tapering slowly to 150mA until full cut-off.

CVTR2P charging performance

CVTR2P charging performance with fan set to 'ON'				
Approximate charging time per channel (minutes)				
Battery Model	Battery Capacity	CC rate (0.5C)	State of Charge (SOC)%	
			90% (mins)	100% (mins)
BV095HDmini	6.6Ah - 95Wh	3.3A	110	150
BV140HDmini	9.9Ah - 143Wh	4.95A	110	150
BV090	6.6Ah - 95Wh	3.3A	110	150
BV100HDplus	6.7Ah - 100Wh	3.35A	110	150
BV150	10Ah - 150Wh	5A	110	150
BV190HDplus	13.4Ah - 193Wh	6A	120	180
BV290HDplus	20.2Ah - 290Wh	6A	180	260

CVTR2P charging performance with fan set to 'OFF'				
Approximate charging time per channel (minutes)				
Battery Model	Battery Capacity	CC rate (0.5C)	State of Charge (SOC)%	
			90% (mins)	100% (mins)
BV095HDmini	6.6Ah - 95Wh	3.3A	110	150
BV140HDmini	9.9Ah - 143Wh	3.5A	150	190
BV090	6.6Ah - 95Wh	3.3A	110	150
BV100HDplus	6.7Ah - 100Wh	3.35A	110	150
BV150	10Ah - 150Wh	3.5A	150	200
BV190HDplus	13.4Ah - 193Wh	3.5A	210	270
BV290HDplus	20.2Ah - 290Wh	3.5A	310	390

Operating Instructions - CVTR2P

This charger *simultaneously* charges two batteries with charging currents of up to 6A, depending on the battery capacity.

The batteries to be charged are V-Lock batteries, which can be BLUESHAPE (preferred) or any other 3rd party compatible batteries can be of any capacity ranging from:

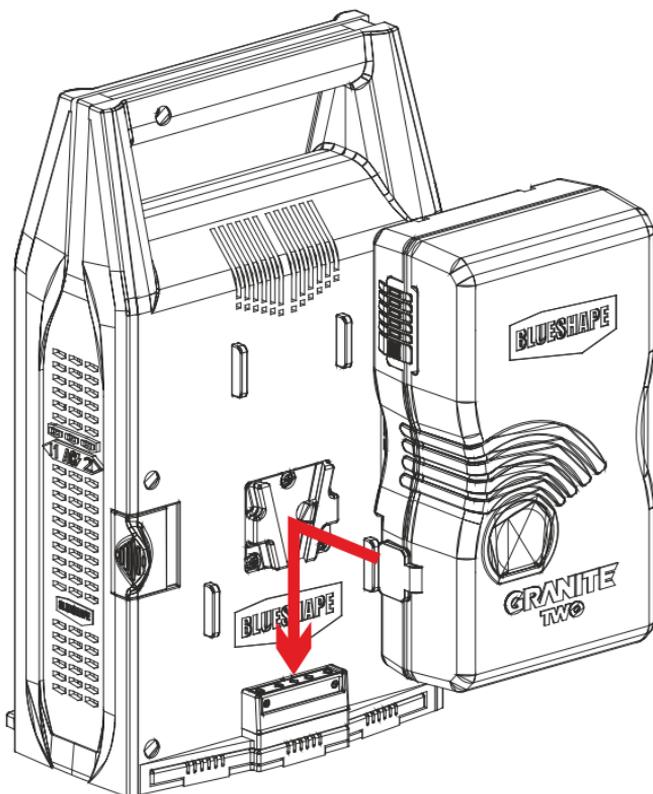
40Wh or even less [having 4 cells in series – total 4 cells]

up to

290Wh or even more [having 4 cells in series and 6 cells or more in parallel – total 24 cells or more]

The charger will automatically select the charging rate to apply.

The batteries are to be inserted in any one or both of the 2 V-plates as indicated in the diagram 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 to lock once again.
- The unit has been designed to remain in balance with just one battery or with 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 inside any one of the two V-plates as indicated in the picture above.
- Observe the battery LED. In addition, the charge status may be read in 20% steps through the BLUESHAPE battery LED array or continuously, using the Wi-Fi features of the battery (see the battery operating manual for the activation of the internal Wi-Fi transmitter).
- Leave the battery to charge for the appropriate time (see table on page 7).
- 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 V-plate adapter. This second battery will start charging immediately and at the correct rate according to its capacity. Once again, observe the LED or monitor the battery status using the Wi-Fi feature.

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

In the case when an accessory 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.

When an accessory is powered into the AUX port and at least a battery is installed, the unit operates as an UPS: in case of a sudden AC power cut, the accessory remains powered if at least a battery is installed and its voltage is higher than 12500mV.

Once the accessory has been unplugged, the charger will continue the previous charging sequence and from the same point of interruption.

AUX port management

The AUX port is always available whenever AC is connected or at least one battery is present and with a voltage greater than 12500mV.

Working without AC

When operating without AC the available power on the AUX port is limited by the power of the installed batteries but up to a controlled maximum of 8A.

The AUX output is always in parallel with one battery at a time. If two batteries are connected, they are discharged sequentially up to a bottom limit of 12500mV. When this threshold is reached by the first battery, the load is automatically connected to the second battery without interruption.

Working with AC

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 - 14.5V regulated @ max 6A
- with fan set OFF - 14.5V regulated @ max 4A

On the other hand, whenever a battery is connected in charge, the max available power on the AUX port depends on the power of the installed battery since if the load on AUX exceeds the available current, the extra power is provided by the battery that in such case is getting discharged. The maximum current is capped @ 8A.

When a battery is in charge and the AUX is powered, it has to be noted that:

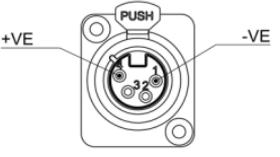
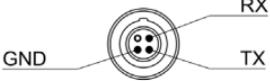
- AUX takes priority
- The available current is shared between the battery on charge and the load on the AUX port. Therefore, the charging current is reduced when the AUX is draining power.
- If the AUX port demand is less than the current that is able to be drawn from the charger then the remaining current will be used to charge the battery.
- If the AUX port demand greater than the current that is able to be drawn from the charger then the battery will go into discharge to supply the rest of the demand.

See the technical specifications on page 11 to understand the different current handling under different conditions.

Battery LED indications

#	LED	INDICATION	EXPLANATION
1	AC	Steady Red	There is no AC present
		Steady Green	There is AC present
2	Bat #1 Bat #2	Steady Green	Battery is full
3	Bat #1 Bat #2	Flashing Green	AC is not present and the blinking channel is ready to power or is actually powering the load on the AUX port
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. The load connected to AUX is absorbing current available and therefore there is not enough power to charge the battery at full rate. The available power is shared between charging and AUX power and the charging current is reduced.
5	Bat #1 Bat #2	Steady Orange	Battery is in constant current (CC) phase
6	Bat #1 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 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 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	AC Bat #1 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 BLUESHAPE battery	Max 6000mA \pm 5% with fan set to ON Max 3500mA \pm 5% with fan set to OFF	
CC-MODE: Output with Alien battery	Max 4000mA \pm 5% with fan set to ON Max 3000mA \pm 5% with fan set to OFF	
CC-MODE: Vmax with BLUESHAPE battery	Max 16800 \pm 50mV (0.3%) regulated based on battery programmed charging voltage	
CC-MODE: Vmax with Alien battery	16600 \pm 50mV (0.3%)	
CV-MODE: Vmax with BLUESHAPE battery	Max 16800 \pm 50mV (0.3%) regulated based on battery programmed charging voltage	
CV-MODE: Vmax with Alien battery	16600 \pm 50mV (0.3%)	
CV-MODE: Cut-off current	150mA \pm 10mA	
Auxiliary power (XLR 4 pin)	With no battery: - Fan state ON: regulated 14.5V @ 6A max \pm 5% - Fan state OFF: regulated 14.5V @ 4A max \pm 5% With battery: nominal 12.5V – 17V @ 8A max \pm 5% depending on the battery available power	
XLR Polarity		Pin 1: -ve Pin 2: nc Pin 3: nc Pin 4: +ve
Data connector pin-outs		
Short circuit protection	Available	
Overcharge protection	Available	
Overtemperature protection	Available	
LEDS	3-colour type for Bat #1, Bat #2, AC	
Special features	Charging current and voltage regulated according to battery capacity for BLUESHAPE or compatible batteries only	
Power supply	AC mains 100V - 240V ~ 47 - 63 Hz autoselect	
Fuse	1 x 220V 2.5A (5x20mm quick blow) + 1 spare	
Power consumption	230W max / 195W typical	
Operating temperature range	0°C - 45°C	
Storage temperature range	-20°C - 65°C (-4°F - 149°F)	
Dimensions	260 x 150 x 85mm (10.24" x 5.91" x 3.35")	
Weight	1250g (2.75lbs)	

The CVTR2P is pending CE certification.

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

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. However 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.

DISPOSAL

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.

This page has been intentionally left blank

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.

In all warranty claims, the buyer must reproduce the original purchase invoice.



NEW CELL TOP Srl
VIA LIGURIA 4-6,
42124 REGGIO EMILIA, ITALY
TEL. +39 0522 518556
FAX. +39 0522 277084
WEB: www.BLUESHAPE.net
EMAIL: info@BLUESHAPE.net