



INTELLIGENT BATTERY CHARGER

FOR V-LOCK LITHIUM ION BATTERIES ONLY

Model

**CVS4XL - Simultaneous Quad Position
Charger with Touch Display and
Auxiliary Power Output**

USER MANUAL



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

Keep these instructions. This manual contains important safety and operating instructions for the CVS4XL charger.

Explanation of symbols used in this manual



This symbol indicates the presence of an electrical shock hazard. It is intended to alert 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 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.

General Safety Instructions

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.

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.



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 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 to the touch 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 become excessively hot during the charging operation.

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

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

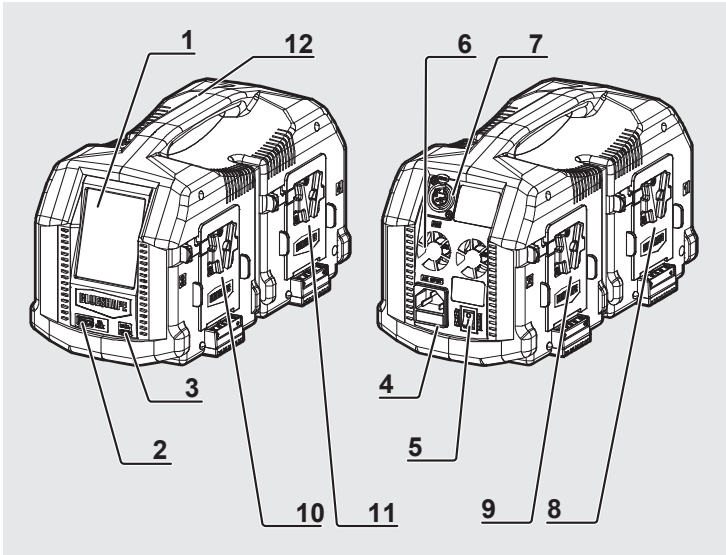
- Do not handle charger, including the charger plug and charger terminals with wet or damp hands.
- Use of an attachment not recommended or sold by the battery-charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
- Make sure that the cord is located so that it will 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.
- 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

CVS4XL Package Contents

CVS4XL

- CVS4XL simultaneous quad position charger with Aux output and Touch Display
- 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-VIII3
 - UK:
UK PLUG: BS1363A W/13A FUSE
 - US:
US PLUG: NEMA 5-15-P
- Instruction manual including safety operating instructions

CVS4XL Graphic Description



1. 3.5" Touch Display
2. USB Charging Port
3. Data socket (for computer connectivity and FW upgrades if needed)
4. Mains socket with fuse
5. Mains switch with indicator lamp
6. Exhaust Ventilation
7. Auxiliary power XLR 4pin
8. V-Lock battery bay #1
9. V-Lock battery bay #2
10. V-Lock battery bay #3
11. V-Lock battery bay #4
12. Carrying handle

Introduction

The BLUESHAPE CVS4XL 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 CVS4XL is capable of delivering up to a maximum of 6 Amps in constant current (CC) mode on all four 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.

The CVS4XL features a 3.5" touch display for intuitive and direct access to charger control and information.

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 CVS4XL

- 3.5" touch display with adjustable backlight.
- Modern, original and robust design. Ideal for regular daily use.
- Sophisticated electronics for accurately detecting the charging requirements and applying the correct charging rate accordingly.
- Simultaneous charging of 4 batteries at a maximum of 6A each battery when fan is switched on.
- Switchable fan for selection of 'FAST' or 'SILENT' charging modes.
- 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.
- 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.
- Fast USB charging at 2A max. current.
- If AC mains is not present or is suddenly cut off, the AUX power is drawn from the batteries and the equipment operates as 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 receptacle via USB Micro-B for computer connectivity and monitoring of BLUESHAPE batteries through BSCVMON free software, directly downloadable from our website.
- Note: USB Micro-B cable not included with product.
- Data receptacle can also be used for firmware updates if necessary, contact BLUESHAPE support for more information.



*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

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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.

CVS4XL 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

CVS4XL 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

Charging Li-Ion Batteries

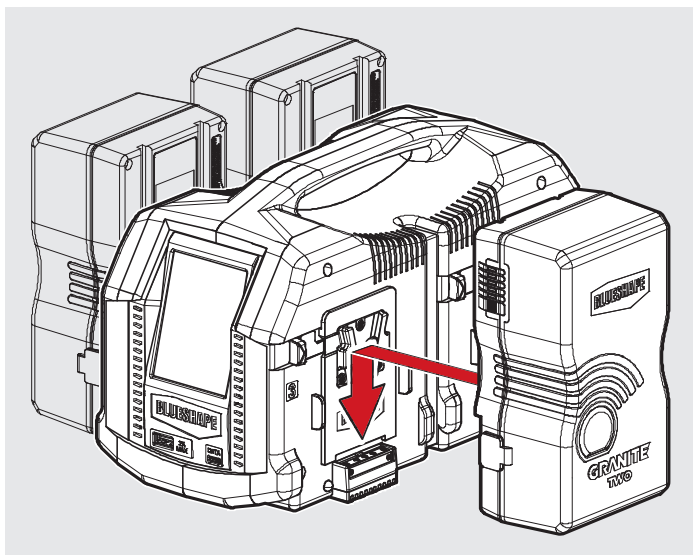
This device **simultaneously** charges four batteries with charging currents of up to 6A, depending on the battery capacity.

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:

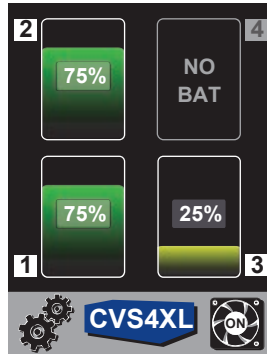
- 40Wh or even less [having 4 cells in series – total 4 cells] up to
- 290Wh or even more [having 4 cells in series and 6 cells or more in parallel – total 24 cells or more]

The charger will automatically select the charging rate to apply.

- Plug the AC power cord provided into the charger AC input and switch on, the integrated indicator lamp will switch on. Display will temporarily show splash screen and main page.
- The batteries are to be inserted in any of the four V-Lock battery bays as indicated in the diagram below:



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- The charging page will show the status of the four bays independently. The bay number on the screen corresponds to the bay number on the charger enclosure.



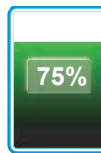
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- When no battery is connected or detected in a battery bay 'NO BAT' is shown in the battery status.



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- When a battery is detected, a throbber indicates battery communication initialisation.



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- Charging capacity status is indicated accordingly graphically and through percentage. A blue pulsing boarder indicated charging in progress.



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- Failure state may be indicated accordingly in case of charge failure to safeguard the charger and battery.



- During charging mode, the fan state can be toggled by tapping on the fan icon in the main screen. This may be done if silent operation of the CVS4XL is required. For charging performance as determined by fan state, refer to the technical specification table in this manual.



- Detailed status information on the individual batteries can be accessed by tapping the respective battery symbol. Note, some details on third party battery packs may not be displayed.

Tap to go to main page

BV270HDtwo SPLASH Serial no. #01727-29	
State of charge	3%
Time to full	222 min
Actual current	4872 mA
Battery voltage	14158 mV
V-Cell 1	3549 mV
V-Cell 2	3542 mV
V-Cell 3	3533 mV
V-Cell 4	3541 mV
Cell temp.	28.7 °C
CH #1: Charging in CC Mode ...	

Tap to open the diagnostic page

Tap to expand message box

- Message box shows additional detail on the bay charging mode. Any error state detail is also shown in this message box.

BV270HDtwo SPLASH Serial no. #01727-29	
State of charge	3%
Time to full	222 min
Actual current	4872 mA
Battery voltage	14158 mV
V-Cell 1	3549 mV
V-Cell 2	3542 mV
V-Cell 3	3533 mV
CH #1: Charging in CC Mode In Constant Current mode the battery is charged with the maximum allowed charging current until it reaches approx 80-90% of charge	

Tap to collapse message box

- Diagnostic page shows additional battery pack information which may be helpful with battery pack troubleshooting.

Battery Diagnostic	
Mfg date	dd-mm-aaaa
Original capacity	99999 mAh
Actual capacity	99999 mAh
State of health	100 %
Cycle count	999 cycles

- Tapping on the cog icon on the main screen will show general charger status and information. Display backlight brightness can be adjusted via the slider at the bottom of the screen.

CVS4XL	
Serial Number	99999
Mfg date	dd-mm-aaaa
Fw version	1.xx-1.xx-1.xx
Power	AC=230V
Fan State	On
Aux port state	Idle
Aux voltage	14500mV
Aux current	9999 mA
Aux power	99 W

Drag slider to adjust backlight brightness

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.

When a device is powered by 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 device remains powered if at least a battery is installed and its voltage is higher than 12500mV.

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

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 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 - 14.5V regulated at max 10A
- with fan set OFF - 14.5V regulated at max 8A

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 at 8A.

When a battery is in charge and the AUX is powered, please note 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.

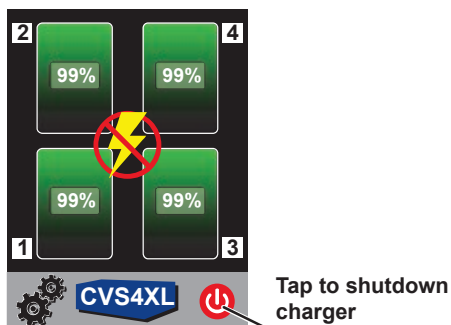
See the technical specifications table in this manual to understand the different current handling under different conditions.

Working without AC Input

When operating without AC the available power on the AUX port is limited by the power of the installed batteries. When at least two batteries are connected on either side of the charger (eg. Bays 1 and 3) the AUX current output is limited to a maximum of 10A. Else, when batteries are installed only on one side of the charger (eg Bays 1 and 2) this maximum output is reduced at 8A.

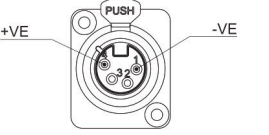
Batteries connected to the same side will be discharged sequentially up to a bottom limit of 12500mV. When this threshold is reached by the first battery, the load is automatically connected to the second battery without interruption. When batteries are connected to opposite sides, they are discharged in parallel.

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- When the charger is operated without an AC input, the main screen will display an overlay to indicate this. The fan icon is also replaced by a power icon to be able to shutdown the charger when not being used as an auxiliary power supply.



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- Tapping on the power icon will switch off the charger. To restart the charger power the charger via an AC input or disconnect and reconnect all battery packs.

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 Third Party 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 Third Party 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 Third Party 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
Short circuit protection	Available	
Overcharge protection	Available	
Overtemperature protection	Available	
USB Charge Output	5V, 2.0A Max.	
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	2950g (6.50lbs)	

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).

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 BLUE-SHAPE battery packs.

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

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.

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.

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