



# INTELLIGENT BATTERY CHARGER

FOR 3-STUD LITHIUM-ION BATTERIES ONLY

Model:

**CGS8XW** - WALL MOUNT

## OPERATING MANUAL





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 remove cover or dismantle the apparatus. 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 240V AC AND LINE FREQUENCIES BETWEEN 43Hz 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.
- 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.

## CGS8XW Package Contents

This device package contains the following:

- CGS8XW wall-mount charger
- Wall Hanging Bracket
- AC Power Cord [according to region]

Device-End Connector: IEC 60320 C13

**EU Plug:** IEC 884/CEE7-VIII3

**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

## Overview

### Charger Variants

This charger comes in three different model variants:

- CVS8XW: For v-lock lithium-ion batteries only
- CGS8XW: For 3-stud lithium-ion batteries only
- CBS8XW: For b-mount lithium-ion batteries only

To clarify your model, check the front panel markings as illustrated below.

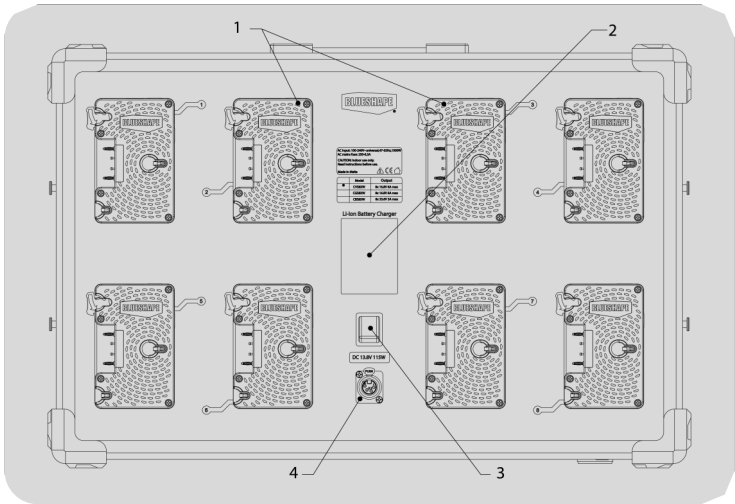
### CGS8XW

	Model	Output
	CVS8XW	8x 16.8V 6A max
•	CGS8XW	8x 16.8V 6A max
	CBS8XW	8x 33.6V 3A max



# Graphic Description

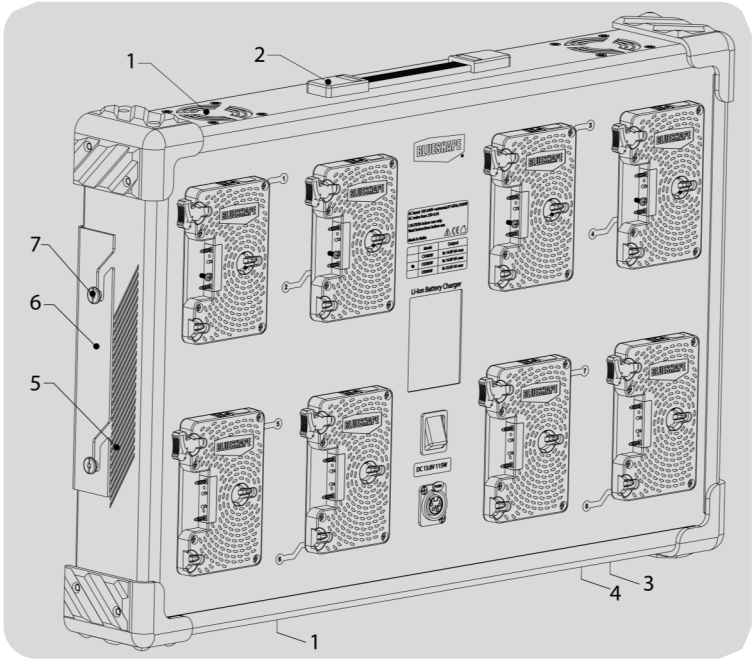
## CGS8XW - Front View



The Charger front facing panel consists of the following:

1. 3-Stud Battery charging bays
2. 3.5" Touch Display
3. Mains switch
4. Aux output connector (14.4V 115W) 4-pin XLR

## CGS8XW - Side View



The Charger frame consists of the following:

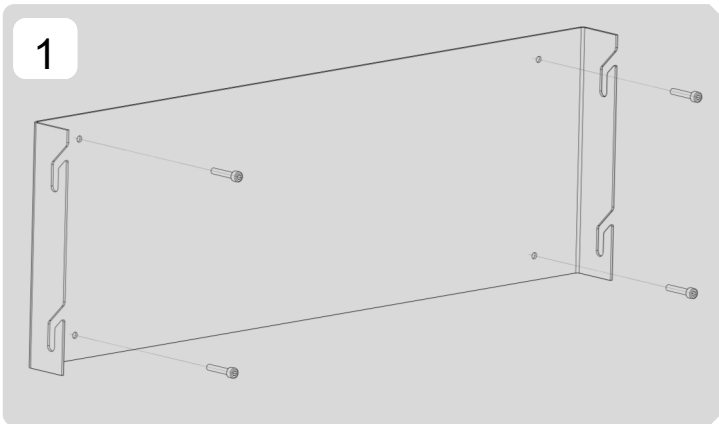
1. Ventilation Outlets
2. Carrying Handle
3. Data connector
4. AC mains input, 100-240V
5. Ventilation Inlets
6. Wall Hanging Bracket (refer to page 9)
7. Supporting lateral studs

# Installation

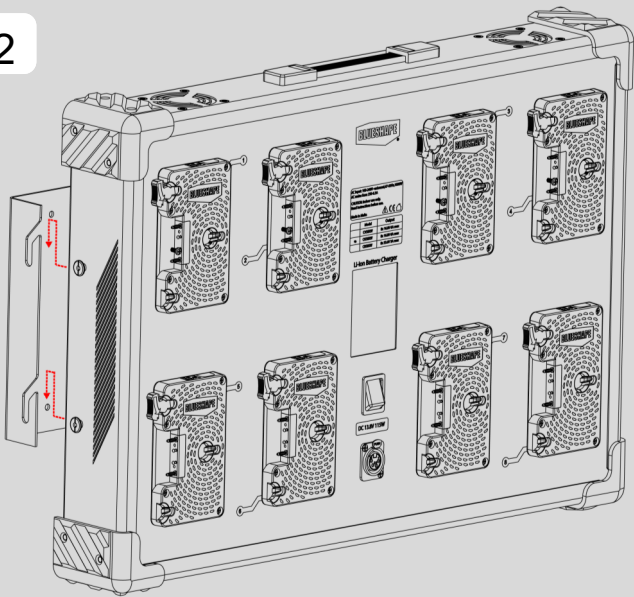
This charger is designed to ideally be installed on a wall.

Find a suitable location allowing for easy access, ensuring that the ventilation inlets/outlets are free from any obstruction.

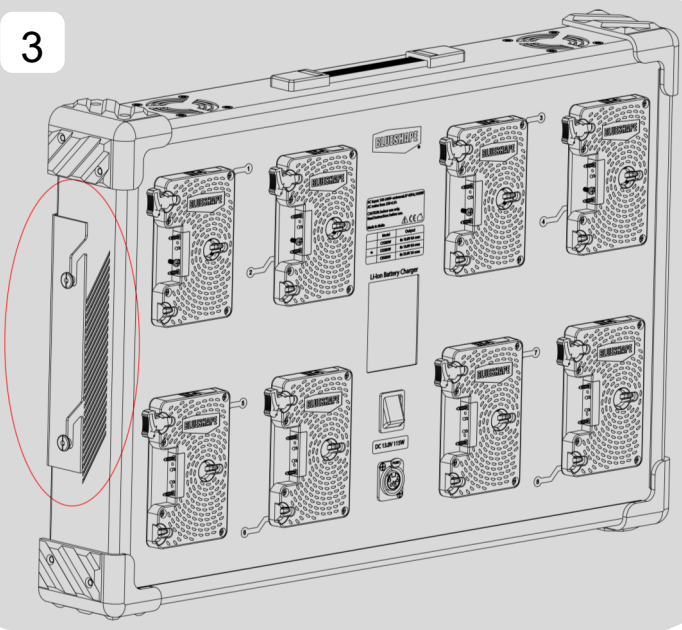
1. Fix the mounting bracket against the wall, using suitable screws and/or fittings. The screws should have sufficient holding power. Tighten all 4 screws and ensure that the bracket is fixed firmly in place.
2. Lift the charger and align the 4 lateral studs with the corresponding slots on the mounting bracket.
3. Slide the studs carefully in the slots and lower the charger to seat in its definitive position. Ensure that all 4 studs are correctly and firmly inserted in their relative slots.



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## Introduction

The BLUESHAPE series of intelligent lithium-ion battery chargers have been specifically designed for fast 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 charger is capable of delivering up to a maximum of 6Amps in constant current (CC) mode on all eight 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 3<sup>rd</sup> party, non-communicative batteries but at a fixed rate. A precaution is included by design in order not to overcharge 3<sup>rd</sup> party batteries or render them unsafe.

This charger has been designed for users having large fleets of batteries, and with a higher daily rotation; the wall mounting feature and the flat form factor makes it discrete and minimally intrusive in any installation.

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

\* $0.5C$  is equivalent to half the battery Ah capacity

### Features of CGS8XW

- Elegant and robust design. Ideal for indoor use.
- Sophisticated electronics for accurately detecting the charging requirements and applying the correct charging rate accordingly.
- Simultaneous charging of 8 batteries at a maximum of 6A each when fan is switched on.
- 3.5" touch display with adjustable backlight
- Pre-charge function for protecting heavily discharged cells against high currents until their voltages rise to a safe level .
- Maximum compactness and space utilisation.
- Switchable fan for selection of 'FAST' or 'SILENT' charging modes.

- Precise constant current (CC) and constant voltage (CV) charging algorithms to match the battery programmed charging voltage.
- Powerful auxiliary output at 14.4V / 115W through 4-pole XLR
- 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
- USB connection to interface the charger with a PC: up to 4 chargers can be monitored by a single PC using BSCVMon - a custom BLUESHAPE software for tracking and monitoring chargers and logging battery fleet history.



\*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 4A (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 150mA until full cut-off.

## CGS8XW 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)
BG095HDmini	6.6Ah - 95Wh	3.3A	150
BG140HDmini	9.9Ah - 143Wh	4.95A	150
BG090	6.6Ah - 95Wh	3.3A	150
BG100HDplus	6.7Ah - 100Wh	3.35A	150
BG150	10Ah - 150Wh	5A	150
BG190HDplus	13.4Ah - 193Wh	6A	180
BG290HDplus	20.2Ah - 290Wh	6A	260

## CGS8XW 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)
BG095HDmini	6.6Ah - 95Wh	3.3A	150
BG140HDmini	9.9Ah - 143Wh	4A	190
BG090	6.6Ah - 95Wh	3.3A	150
BG100HDplus	6.7Ah - 100Wh	3.35A	150
BG150	10Ah - 150Wh	4A	200
BG190HDplus	13.4Ah - 193Wh	4A	270
BG290HDplus	20.2Ah - 290Wh	4A	390

# Operating Instructions

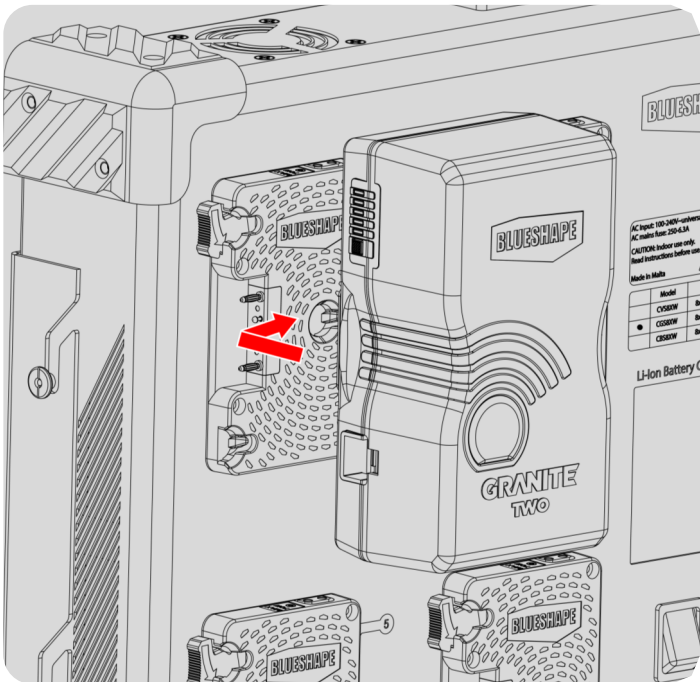
This device **simultaneously** charges eight batteries with charging currents of up to 6A, depending on the battery capacity.

The Li-ion batteries can be either BLUESHAPE (preferred) or any other 3<sup>rd</sup> 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]

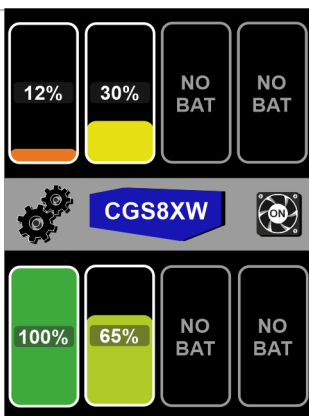
The charger will automatically select the charging rate to apply.

- Plug the AC power cord provided into the charger AC input and switch on. Display will temporarily show splash screen and main page.
- The batteries are to be inserted in any of the eight battery bays as illustrated below.





- The charging page will show the status of the eight bays independently.



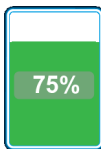
- When no battery is connected or detected in a battery bay 'NO BAT' is shown in the battery status.



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



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



- 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 CGS8XW 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

Tap to open the diagnostic page

BG290HDplus Serial no. #01234-49	
State of charge	12%
Time to full	222 min
Actual current	6000 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 expand message box

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

Tap to collapse message box

BG290HDplus Serial no. #01234-49	
State of charge	12%
Time to full	222 min
Actual current	6000 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	

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

Battery Diagnostic	
Mfg date	29-08-2023
Original capacity	20400 mAh
Actual capacity	20280 mAh
State of health	100 %
Cycle count	10 cycles

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- 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.

CGS8XW	
Serial Number	23
Mfg date	01-09-2023
Fw version	1.01-1.00-1.00
Power	AC ON
Fan State	On
Aux port state	Ready
Aux voltage	14500mV
Aux current	0 mA
Aux power	0 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 - 14.4V regulated at max 10A
- with fan set OFF - 14.4V regulated at 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:

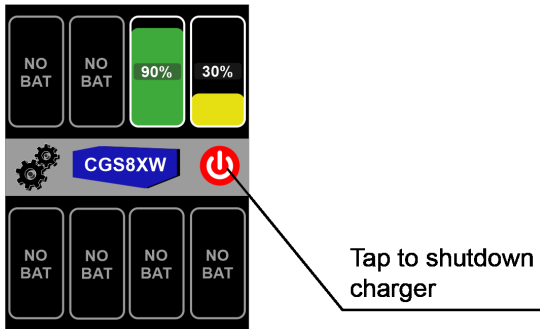
- The available current is shared between the battery on charge and the load on the AUX port. Therefore, the charging current is reduced when the AUX is draining power.
- If the AUX port demand is less than the current that is able to be drawn from the charger then the remaining current will be used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

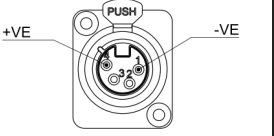
Working without AC Input is limited to the bottom bays of the charger (Any Bay from 5 to 8). When operating without AC the available power on the AUX port is limited by the power of the installed battery/batteries up to a maximum of 8A.

- 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.



- 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 ON Max 4000mA $\pm$ 5% with fan OFF	
CC-MODE: Output with Third Party Battery	Max 4000mA $\pm$ 5% with fan ON Max 3000mA $\pm$ 5% with fan 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 14.4V @ 6A max $\pm$ 5% Fan state ON: regulated 14.4V @ 4A max $\pm$ 5% With battery: nominal 12.5V – 17V @ 8A max $\pm$ 5% depending on the battery available power	
XLR Polarity (4 pin )		Pin 1: -ve Pin 2: nc Pin 3: nc Pin 4: +ve
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 - 240V ~ universal, 47 - 63 Hz, 1000W	
Fuse	1 x 250V-2.5A + 1 spare	
Power consumption	900W 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	620 x 410 x 110mm (24.4" x 16.14" x 4.33")	
Weight	10.6Kg (23.37lbs)	

## **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 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:

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