



INTELLIGENT BATTERY CHARGER

FOR 3-STUD LITHIUM ION BATTERIES ONLY

Model

**CGR4 - Simultaneous Quad Position
Ruggedised Charger**

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 CGR4 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 APPA-
RATUS AND ALWAYS REFER ANY SERVICING TO QUALI-
FIED 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 in use 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.
- This is a class A device, operation of this equipment in a residential environment could cause radio interference.

- 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

CGR4 Package Contents

CGR4

- CGR4 simultaneous quad position charger
- 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

Introduction

The BLUESHAPE CGR4 intelligent lithium ion battery charger has been specifically designed and optimized for fast, safe and reliable charging of BLUESHAPE batteries. The CGR4 is capable of delivering up to a maximum of 4.8 Amps in constant current (CC) mode on all four channels simultaneously. This makes it ideal for fast turnaround, especially when using higher capacity batteries. CGR4 can also charge 3rd party batteries.

The CGR4 is built in a rugged portable hard case. When the lid is closed, it can withstand shocks as well as dust and water ingress.

Features of CGR4

- 4-Bay charger in a ruggedized form factor.
- Simultaneous charging of 4 batteries at a maximum of 4.8A each battery.
- Three-colour LED indicator for individual charge-bay monitoring.
- 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 charge battery packs safely and
- Charger thermal protection to limit charging current when charger is operating at elevated temperatures to prevent over-heating.

Operating Instructions

Charging Li-Ion Batteries

This device can charge 3-Stud batteries, which can be BLUESHAPE (recommended) or any other 3rd party compatible batteries. The procedure is as follows:

- Plug the AC power cord provided into the charger AC input and switch on, the integrated indicator lamp will switch on.
- The batteries are to be inserted in any of the four 3-Stud battery bays.
- Dedicated Bay LED will indicate the charge status of the battery (refer to the next page).
- It is recommended to operate to keep the lid open during use to maintain adequate ventilation. The charger performance may be limited to prevent over-heating.

Battery LED indications

#	OPERATING MODE	TIMEOUT	LED INDICATION
1	BATTERY DETECTION Battery detected while the other on the same pair is already charging		BATTERY WAITING: GREEN: 1sec ON/1sec OFF
2	BATTERY NOT ALLOWED 10Kohm < ID resistor < 60Kohm		BATTERY NOT ALLOWED: GREEN: 500ms/RED: 500ms
3	BATTERY EVALUATION i) Total pack voltage < 8000mV ii) $I < 10\text{mA}$ If the charging does not rise within 30sec, the battery does not accept charge iii) Very Low Single cell voltages < 2800mV $10\text{mA} < I < 50\text{mA}$ iv) Low Single cell voltages > 2800mV Total pack voltage < 13000mV $50\text{mA} < I < 300\text{mA}$	3600sec 1200sec	VOLTAGE TOO LOW: RED flashing 500ms ON/500ms OFF BATTERY FAILURE: Steady RED PRECHARGE-1: Slow ORANGE flashing 500ms ON/500ms OFF PRECHARGE-2: ORANGE flashing 250ms ON/250ms OFF
4	CONSTANT CURRENT MODE $13000\text{mV} < V < 16750$, $I = \text{max } 4\text{A}$	18000sec	CC-MODE: Steady ORANGE
5	CONSTANT VOLTAGE MODE $V > 16750\text{mV}$ $150\text{mA} < I < 4000\text{mA}$	10800sec	CV-MODE: ORANGE 500ms/ GREEN 500ms
6	FULL CHARGE $V \cong 16800\text{mV}$ $I \cong 150\text{mA}$		FULL CHARGE: Steady GREEN
7	OTHER INDICATIONS In the case of premature charge termination, the charger retries to charge the battery every 30 seconds. If after 10 minutes, there is still no response, the indication is changed into 'BATTERY FAILURE'		PREMATURE CHARGE TERMINATION: RED: 250ms ON/100ms OFF /250ms ON /1sec OFF (2 blinks + 1 pause) BATTERY FAILURE: Steady RED

Technical specifications

Type	Li-ion constant current and voltage control system
CC-MODE: Output Current	4800mA $\pm$ 1%
CC-MODE: Vmax with BLUESHAPE battery	Max 16800 $\pm$ 50mV (0.3%) regulated based on battery programmed charging voltage
CV-MODE: Vmax with BLUESHAPE battery	Max 16800 $\pm$ 50mV (0.3%) regulated based on battery programmed charging voltage
CV-MODE: Cut-off current	150mA $\pm$ 10mA
Short circuit protection	Available
Overcharge protection	Available
Over-temperature protection	Available
Special features	Pre-Charge System and Charger Thermal Protection
Power supply	AC mains 100V - 240V ~ 47 - 63 Hz autoselect
Fuse	1 x 220V 2.5A (5x20mm quick blow) + 1 spare
Power consumption	400W max / 360W typical
Operating temperature range	0°C - 45°C
Storage temperature range	-20°C - 65°C (-4°F - 149°F)
Dimensions	434 x 371 x 193 mm (17.09" x 14.61" x 7.60")
Weight	6.1Kg

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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