

Part No:  
BC1220  
BC1220B  
BC1240  
BC1240B  
BC2420B

**AMPS**  
ADVANCED MOBILE POWER SYSTEMS



QR code  
website link



TEMP1



Temperature sensor  
included



www.ampsystems.co.uk

Warranty (5 years return to factory)

Copyright © 2021  
AMPSystems  
All Rights Reserved

# Advanced Mobile Power Systems AC to DC Battery Charger - 2 output Handbook

BC1220 - 12V | 20A  
BC1240 - 12V | 40A



BC1220B - 12V | 20A w/ Bluetooth  
BC1240B - 12V | 40A w/ Bluetooth  
BC2420B - 24V | 40A w/ Bluetooth

Part No:  
BC1220  
BC1220B  
BC1240  
BC1240B  
BC2420B

Perfectly suited for charging  
our lithium batteries:

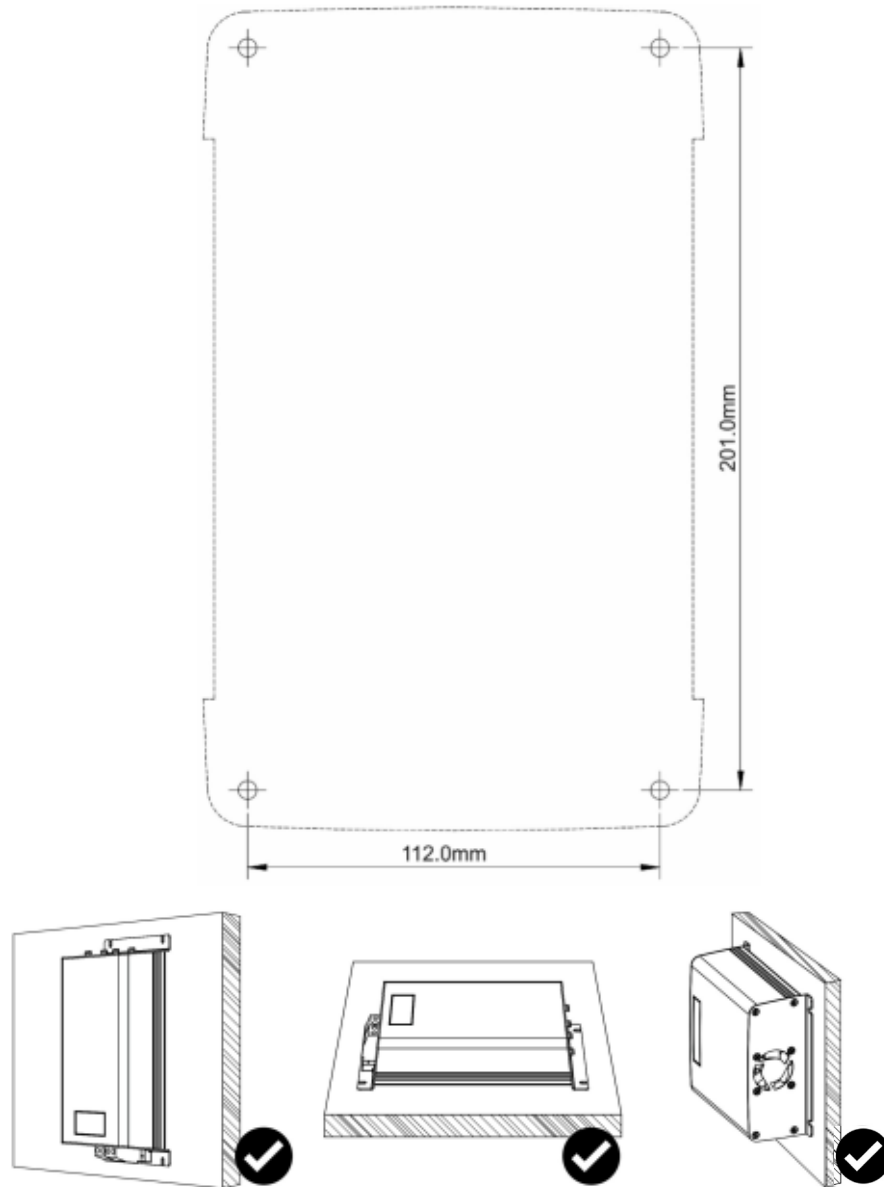
AL1260 - 12V 60Ah  
AL1280 - 12V 80Ah  
AL12100 - 12V 100Ah  
AL12120 - 12V 120Ah  
AL12150 - 12V 150Ah  
AL12200 - 12V 200Ah  
AL12300 - 12V 300Ah

AL24150 - 24V 150Ah



## INTRODUCTION TABLE OF CONTENTS

Introduction	
02	Table of Contents
03	Welcome - Specifications Sheet
Safety and Legal	
04	Legal Guidelines / Warranty Statement
05	Safety Guidelines
Product Information	
06	Annotation of BC's Front and under cover sections
07	Annotated diagram of front section of BC Series
08	Annotated diagram of connector panel
09	Setting Battery Types   Power Reduction Modes   Desulphation
10	Wiring diagram examples
Troubleshooting	
11	Troubleshooting and fault finding



If prone to getting damp, this mounting option may result in pooling of water at the bottom



**INTRODUCTION WELCOME**

**Welcome**

Welcome to the AMPS Owners Handbook for this range of AC to DC battery chargers that are ideal for charging our range of lithium batteries.

Please take your time to read and fully understand the contents of this Handbook. These guidelines are developed with your safety and the products performance in mind and failure to follow or understand these guidelines may lead to voiding the product warranty or even leading to damage or injury for you or your setup.

If you are unsure of any step or guideline then please consider reaching out to AMPS.

This AC to DC battery charger is a device designed to charge 2 battery banks of any Ah capacity. Typically, you may have a starter battery and a leisure battery bank. This charger is ideally suited to charge both battery banks and to keep them maintained. Even though we market these chargers for our lithium batteries, they work on any lead acid style (AGM / Gel / Sealed / Calcium) battery and on other lithium battery manufactures.

The term '12V' or '24V' is the nominal voltage, not the specific voltage.

**Using this Handbook**

This manual must be read throughout before installing this electronic device. Do not lose these instructions - keep them safe. The most up to date instructions can be found our website. Please refer to the latest instruction manual before contacting us. We endeavour to include all of the product information that we can think of into the manual.

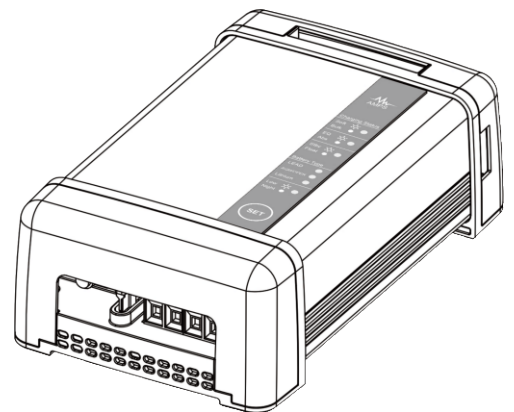
Installation of the electronic device must be carried out by qualified and trained personnel only. The personnel must be familiar with the locally accepted guidelines and safety measures.

**Safety**

Your safety is our top priority. Please follow all precautions to keep yourself safe. If you believe your unit requires repair then please contact us or your distributor. Do not attempt to service the unit yourself.

**Specifications**

Model	BC1220   BC1240	BC2420
AC Input Voltage	180-264VAC 50Hz~	
AC Full Load	≤5A	≤5A
No Load Input Current (Standby)	≤120mA	≤120mA
Output (Charge) Voltage Selection		
	Absorption	Float
Lead	14.2V	13.5V
AGM	14.7V	13.5V
LiFePO4	14.4V	13.8V
Equalization for Lead	16.1V / 3A	32.2V / 1.5A
DC Source Mode	13.5V /28A	26V / 14A
Standby Voltage for Lead / AGM	13.2V	26.4V
Minimum Battery Voltage	0V+	
Recycle Day	7 days	
Remote Battery Temp. Sensor (supplied accessory)	Yes, -20mV/°C	Yes, -40mV/°C
Max. Output Charge Current	40A	20A
Soft Start Bulk Charge Current	20A	10A
Low Mode Charge Current	10A	5A
Efficiency	>91%	>91%
Protections	Short Circuit protections, selfrecoverable Over temperature protection, 3 steps decrease of output power, selfrecoverable Battery over temperature protection, with battery remote sensor, selfrecoverable Reverse Polarity(fused) (Replace by 25A x2 fuse for 40A, 25A fuse for 20)	
Cooling	Thermostatically Controlled Variable Low speed FAN-(Full speed)	
Operating Temperature	-10°C to +50°C (Maximum Output up at 40°C)	
Back Drain Current	Less than 1Ah/month	
Remote Control	Optional Accessory	
Wireless Remote Control	WiFi/ Bluetooth models only Remote Control by PC software / Smart phone APPS	
Approvals	EN55014, EN61000, EN60335, EN62233	
Dimension (LxWxH)	223x135x73mm	223x135x73mm
Weight	1.8kg	1.8kg
Recommended Battery Capacity Range	135Ah-400Ah (40A) 70Ah-200Ah (20A)	70Ah-200Ah (20A)



**Part No:**  
BC1220  
BC1220B  
BC1240  
BC1240B  
BC2420B



## SAFETY AND LEGAL SAFETY GUIDELINES

### Product Guidelines

Your AMPS product should only be utilised for its designated purpose. Use the BC series charge ONLY :  
For AC to DC power conversion  
With fuses protecting both positive DC cables  
In a well ventilated, dry, dust-free and condensation free environment  
When the Owners Handbook has been read and wholly understood

### Transport and Storage

Ensure that the mains supply and battery leads are disconnected before transporting or moving the unit. No liability can be accepted for damage in transit once equipment has been unpackaged. Store the product in a dry environment, between  $-20^{\circ}\text{C}$  to  $60^{\circ}\text{C}$ .

Refer to the battery manufacturer's manual for information on transportation, stowage, charge rates, recharging and battery disposal for your battery care.

### General Maintenance

The device must be switched off during maintenance and all cables removed from the direct feed to or from the unit. It must also be protected against unexpected switching off. Remove battery connections and ensure unit is off. If repair is required, only use original parts. Unauthorised attempts to repair Sterling units will lead to the warranty being voided. Only someone with adequate understanding of electronics and the unit itself should attempt a repair.

Ensure your connections are good and clean and aim to protect your unit from humidity and water ingress.

### Safety Precautions

Electrical appliances can be heavy. Please do not lift heavy units unassisted.  
Ensure that your product is correct for your intent. 12V battery. Incorrect use can lead to damage.  
Orientation is not critical to unit function, however may affect water ingress rating.  
Isolate AC wires during install.  
Connect AC to a Residual Circuit Breaker (RCD) and current overload trips.  
AMPS recommend Multi Core Tri Rated AC cable  
Install device in a well ventilated space for cooling purposes.  
Do not expose the unit to snow, rain, water, spray, condensation, pollution etc, unless it is a waterproof unit. If it is a waterproof unit, only expose it to situations it is correctly rated for.  
Do not cover or obstruct the ventilation.  
Device connects to common negative. Common negatives must be earthed.  
In case of fire, use fire extinguisher equipment suitable for electrical fires.  
Avoid all possibilities of reverse polarity or short circuiting.  
Check cabling and connections frequently and ensure the connections are sufficient.  
Always protect DC cabling with the appropriate fusing.  
Ensure the unit is adequately and safely mounted to prevent displacement and damage.  
Always use a professional to install electrical products.  
Ensure the product is correctly set up for your battery.  
Keep out of reach of children

### WARNING :

All electrical appliances carry the risk of electrical shock. This equipment is designed to be used in combination with a permanent energy source (the battery). Always isolate the DC before performing any maintenance or inspection.

Do NOT remove the panelling to inspect the internals unless expressly told to by Sterling. This is not a product designed to be user-serviced.

Do NOT use the device in situations where there is danger of gas / dust / vapour explosions, or around potentially flammable produce.





## SAFETY AND LEGAL LEGAL GUIDELINES

### Warranty and Terms

Your 100 % satisfaction is our goal. We realise that every customer and circumstance is unique. If you have a problem, question, or comment please do not hesitate to contact us. We welcome you to contact us even after the warranty and return time has passed.

Each product manufactured by AMPS comes with a 5 year limited factory warranty. Certain products have a warranty period. Each product is guaranteed against defects in material or workmanship from the date of purchase. At our discretion, we will repair or replace free of charge any defects in material or workmanship that fall within the warranty period of the AMPS product. The following conditions do apply:

- The original receipt or proof of purchase must be submitted to claim warranty. If proof cannot be located a warranty is calculated from the date of manufacture.
- Our warranty covers manufacture and material defects. Damages caused by abuse, neglect, accident, alterations and improper use are not covered under our warranty.
- Warranty is null and void if damage occurs due to negligent repairs.
- Customer is responsible for inbound shipping costs of the product to AMPS in England.
- AMPS will ship the repaired or warranty replacement product back to the purchaser at their cost.

If your order was damaged in transit or arrives with an error, please contact us ASAP so we may take care of the matter promptly and at no expense to you. This only applies for shipping which was undertaken by our company and does not apply for shipping organised by yourself. Please do not throw out any shipping or packaging materials. All returns for any reason will require a proof of purchase with the purchase date. The proof of purchase must be sent with the returned shipment. If you have no proof of purchase call the vendor who supplied you and acquire the appropriate documentation.

To make a claim under warranty, call our customer care check telephone numbers on [ampsystems.co.uk](http://ampsystems.co.uk). We will make the best effort to repair or replace the product, if found to be defective within the terms of the warranty. AMPS will ship the repaired or warranty replacement product back to the purchaser, if purchased from us.

Please review the documentation included with your purchase. Our warranty only covers orders purchased from AMPS. We cannot accept warranty claims from any other AMPS distributor. Purchase or other acceptance of the product shall be on the condition and agreement that AMPS LTD shall not be liable for incidental or consequential damages of any kind. Some states may not allow the exclusion or limitation of consequential damages, so, the above limitations may not apply to you. Additionally, AMPS LTD neither assumes nor authorizes any person for any obligation or liability in connection with the sale of this product. This warranty is made in lieu of all other obligations or liabilities. This warranty provides you specific legal rights and you may also have other rights, which vary from state to state. This warranty is in lieu of all other, expressed or implied.

### Copyright and Plagiarism

Copyright © 2021 AMPS. All rights reserved.

Reproduction, transfer, distribution or storage of part or all of the contents of this document is strictly prohibited. If you wish to use all of this document, or excerpts from it, AMPS must be contacted.

### Liability

AMPS can not accept liability for:

- consequential damage due to use of this device
- possible errors in the manuals and the results thereof

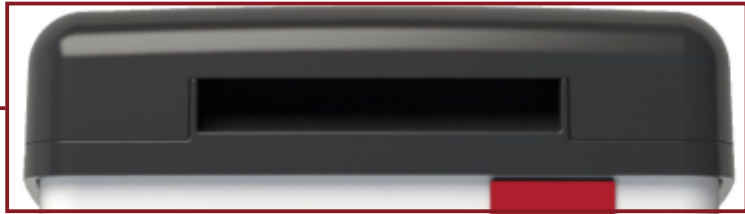
### Device Modification

Please do not modify the device unless you have been instructed to do so by AMPS directly. Product modification shall be done at AMPS, when needed. Warranty shall be voided if personal attempts are made to modify the device without AMPS's approval.



**PRODUCT INFORMATION** UNDERSTANDING YOUR BATTERY CHARGER

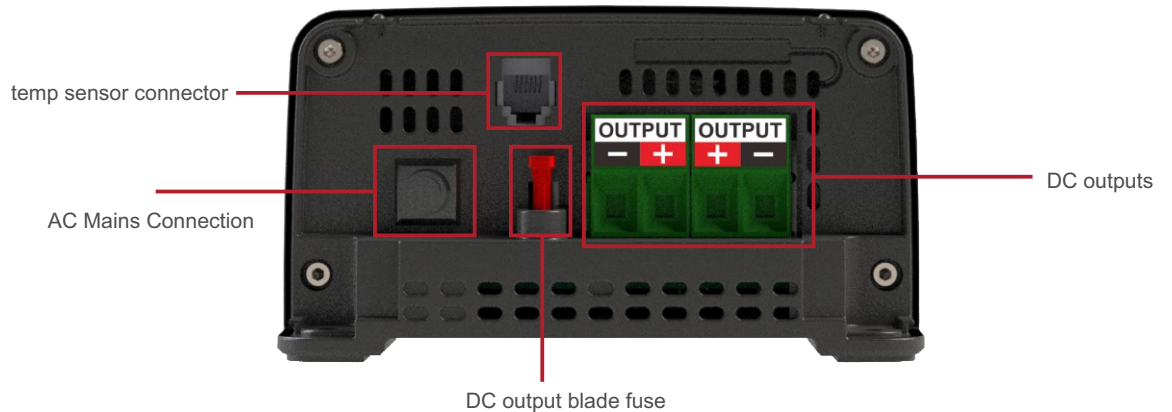
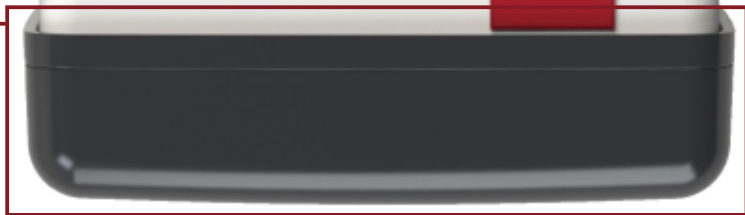
Top end cap, removable.  
Remove to expose:  
Twin fan inlet vents.  
2x top mounting feet.



Charging status region.  
More information overleaf

SET button - used in setting  
battery types.

Bottom end cap, removable.  
Remove to expose:  
DC connectors,  
AC cable,  
fuse / fuse holder  
battery temperature sensor connector.  
2x bottom mounting feet.

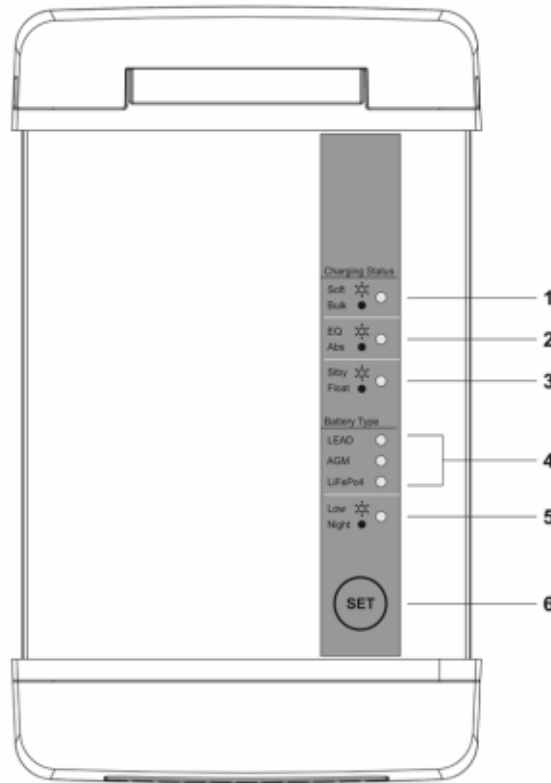




## PRODUCT INFORMATION UNDERSTANDING YOUR CHARGER

Battery Charger Connectors  
Remove the end cap with fingers

\*Label rendered for clarity,



- 1) if LED is flashing, the charger has begun and is in 'soft start'. If on solid, the charger is in bulk mode.
- 2) if LED is flashing, the charger is in equalisation / desulphation mode. If on solid, the charger is in absorption
- 3) if LED is flashing, the charger is in standby. If on solid, the charger is in float mode.
- 4) Battery type LEDs
- 5) Reduced power modes. If flashing low power. If solid, low power for 8 hours.
- 6) SET button to operate menu settings



Temperature sensor included

### Important information regarding the provided temperature sensor - Please read, no simple solution

If you are charging just our lithium batteries (AMPS) - set the charging profile to lithium (default) and, if you wish to install the temperature sensor, install it onto the negative terminal of the battery. The temperature sensor shall protect your system from high temperatures at the terminal.

If you have a lithium battery that does not stop the charge flow at  $\leq 0$  DegC, then please ensure the charger is set to lithium charge profile and you have a temperature sensor installed.

If you plan on using the temperature sensor for 0DegC trip and are mixing lithium and lead acid, ensure you have the charging profile set to lithium.

If you are only charging lead acid batteries, then fitting the temperature sensor is okay and shall simply compensate at 20mV / DegC (from 20 DegC).

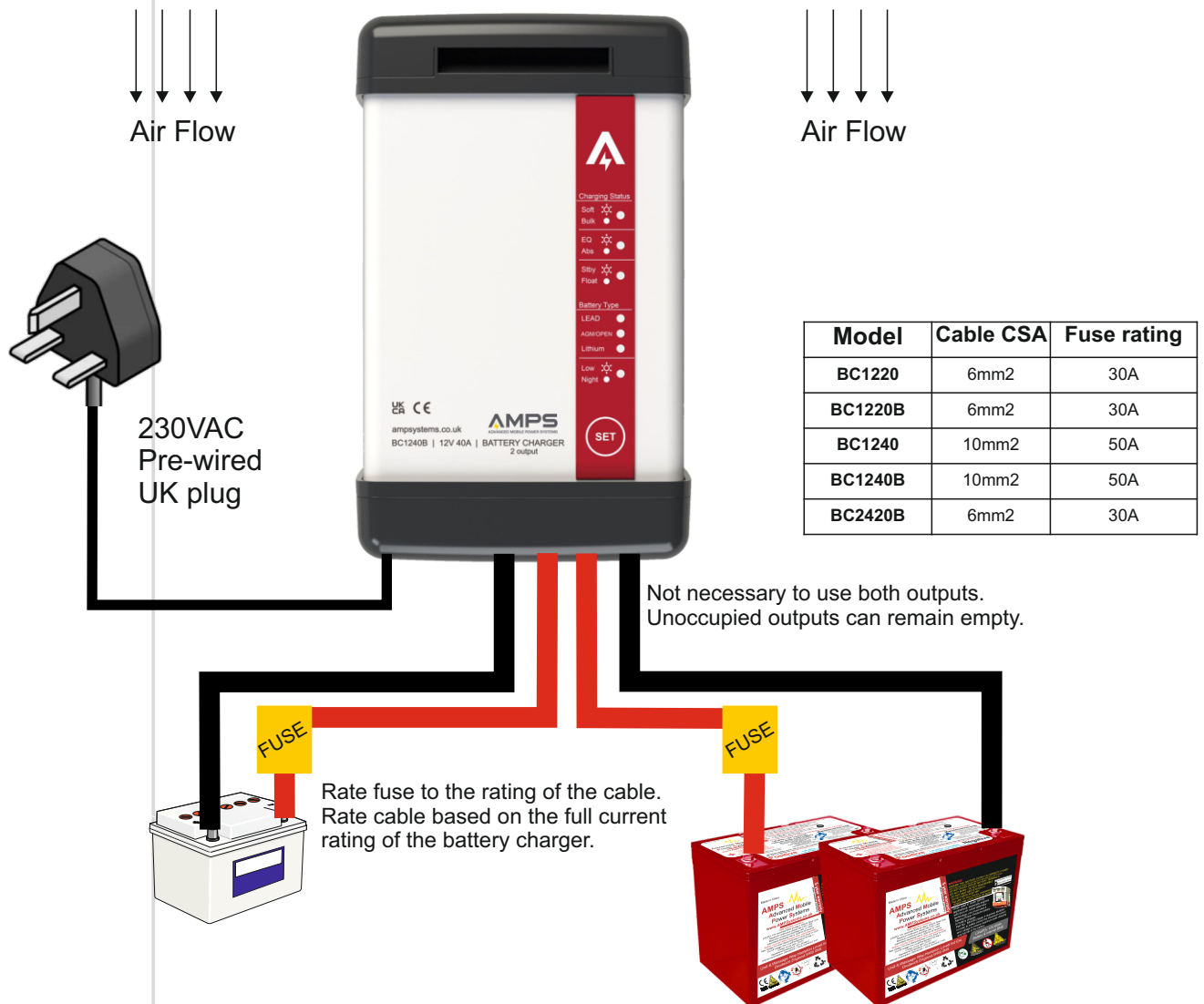


**PRODUCT INFORMATION UNDERSTANDING YOUR , PT.1**

**Simple installation instructions**

- 1) First, install fuses in the positive DC cables that are appropriate for the size of cable being used. Ensure the size of cable being used is appropriate for the current rating of the charger - there is a table below of recommendations. Install fuses in fuse holders approximately 15-18cm from the positive terminal of the battery.
- 2) Then, connect a positive cable from the charger's positive terminal(s) to the positive terminal of the battery(ies).
- 3) Run a negative cable from the charger's negative terminal(s) to the negative terminals of the battery(ies). Ensure all connections are tight with good contact and appropriate surface area contact. This ensures better charger performance and reduced heat build up.
- 4) After DC cables are connected, plug the AC plug in a normal mains socket (~230VAC).
- 5) Once mains is turned on, the charger shall turn on and begin charging in default settings.

\*Label rendered for clarity,





**PRODUCT INFORMATION** Using the SET button / Changing battery types

Setting battery types



When you turn the charger on for the first time, the charger shall boot up with the Lithium green LED illuminating. For the first 3 minutes you can adjust the charger's settings (don't worry, changes can be made later). If you wish to change battery type simply quick press the SET button and the LED shall toggle through the 3 battery types and then illuminate all 3 LEDs - this is float.

LED sequence	Battery Type	Absorptions (V)	Float (V)
LEAD	Lead	14.2V	13.5V
AGM / OLA	AGM / open	14.7V	13.5V
Lithium	Lithium	14.4V	13.8V
LEAD AGM Lithium	Float	N/A	13.5V

Once you have selected which profile you want. Simply let go of the SET button and wait. The charger shall store that setting, even when turned off and on again. If there are no profiles that match what you require there is no harm in choosing the slightly lower voltage setting. If you set the charger to Float mode - the charger shall simply put out 13.5V indefinitely.

Temperature sensor



The impact the temperature sensor on the charger, are as follows:  
 In LEAD, AGM / OLA: if the temperature sensor reads 20DegC the voltage corresponds exactly with what the table above suggests. The further the deviation from 20DegC the further the voltage deviation. The amount is +/-20mV/DegC. If temperature is cooler than 20DegC then the voltage increases by 20mV / DegC. If the temperature is higher than 20DegC then the voltage reduces by 20mV / DegC. For example, at 10DegC, in AGM, the absorption voltage shall be 200mV higher at 14.9V and float shall be 13.7V.

In lithium: No voltage compensation whatsoever. If at 0DegC or lower, charger trips.

Power reduction mode:

- Low power
- Night Mode

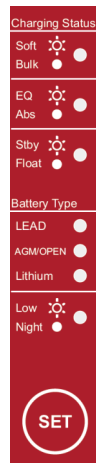


If you wish to put the charger into a 'low' power setting press and hold SET for 3 seconds and the LED here shall flash. This shall drop the current rate to approximately 10A. It shall remain at 10A forever, until you repeat this procedure until the LED turns off completely.

To activate 'night' mode. Press and hold the SET button again for 3 seconds until the LED here remains solid. This shall drop the current rate to approximately 10A, for 8 hours only. This removes fan noise, whilst maintaining charge on to your battery. After 8 hours the charger goes back to full charge capability.

Equalisation / Desulphation Mode

Only works when in LEAD battery type



If you wish to put the charger into equalisation / desulphation mode, you must put the charger into LEAD mode first.

Once in LEAD mode, press and hold the SET button for 5 seconds and let go. The low LED shall flash. Press and hold SET button down again the Night LED shall be on solid. Then press and hold SET button down again for 5 seconds and the EQ LED shall flash. Once you see the EQ LED flashing, leave the charger alone and it shall eventually output ~15.5V (x2 for 24V). To take the charger out of desulphation simply press the SET button.



## PRODUCT INFORMATION Charging Wiring Examples

These diagrams should simply illustrate that the battery charger can be wired in any combination that you like.

You can use either one or both outputs.

Ensure you are charging either 12V or 24V, do NOT mix.

The negative terminal is common, so you do not need to use it if your DC system already has a common negative (refer to picture 2). There is no harm in applying it anyway.

You can charge lithium and / or lead acid batteries at the same time.

If you are mixing battery types we would recommend setting the charger's profile to the lower voltage.

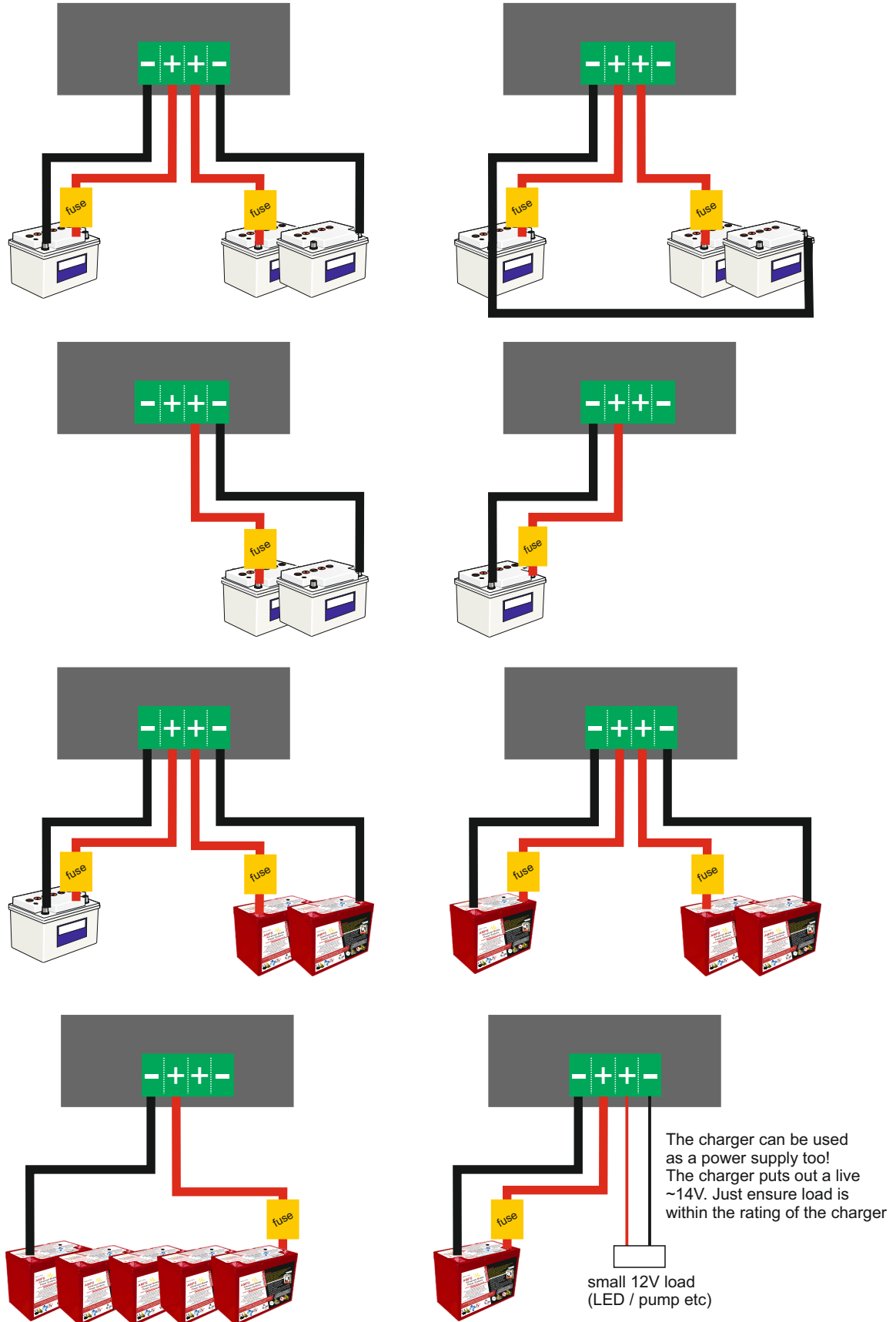
For example, if you have a battery that requires 14.2V maximum and you have an open lead acid / AGM battery that can be charged at 14.7V, we recommend setting the charger to 14.2V.

If you have one of our lithium batteries installed they shall happily accept 14.7V if you wish to use this charging voltage for your other battery type.

Please remember that the current rating of the battery charger is the total combined maximum current. Therefore, if you have used both outputs to charge batteries the total current shall be spread across the 2 outputs.

This will never be an exactly even spread as emptier batteries demand more current.

Please also remember that lithium batteries have lower resistance to current than lead acid style batteries. If you have a lead acid battery and a lithium battery in your installation the chances are most of the current shall travel towards the lithium battery first.





## Troubleshooting & Faults

### Troubleshoot,

Firstly, ensure the charger is wired up correctly. Ensure clean connections, good surface area contact, ensure fuses are in tact. A general rule of the thumb is that the voltage across the positive and negative at the charger should be approximately what the voltage is across the battery(s) that is connected to it. If there is a substantial discrepancy, please ensure there is thick enough cable and / or continuity between both the charger and the batteries.

#### Is your output voltage slightly higher or lower than expected - even with no loads / chargers on?

Check if you have the temperature sensor connected. If so, no problems leaving it there, it is simply voltage compensating for when the temperature at the sensor is lower or higher than the benchmark 20DegC (69F). If lower, then the voltage shall rise and vice versa. The further from 20DegC in either direction leads to proportional increase or decrease in the voltage.

If the voltage at your output battery is 0.3V lower (or more) than at the output of the charger - this is likely due to poor / thin cabling. And / or, due to voltage drop across fuses / fuse holder / isolation switch / relay / diode etc.. between the output of the charger and your output battery. Beef up the cable, clean connections, ensure connections are as tight as possible, remove unnecessary devices (such as isolation switches, relays or diodes) - these are really not required here.

Problem	Possible Cause	Suggested solution	Recovery Condition
ALL LEDs OFF	No AC input Poor AC input	Ensure the charger is connected to a nominal 230VAC 50Hz Supply. If supply is okay, ensure cable and continuity to the charger is okay. 180-264VAC 50Hz~	Once correct AC voltage and correct frequency is detected, charger should turn on.
ALL LEDs OFF	Output DC voltage has been dragged very low (<6V). If the load current exceeds the charger rating the voltage collapses. If dragged too low LEDs turn off	Remove loads on battery charger / charger. You would benefit from adding more charging sources as your loads are outstripping your charging capability.	The fault shall clear automatically when input voltage rises again (6V+), when loads have been removed.
ALL LEDs OFF	Charger damaged / failed	the charger may simply have failed contact us	N/A
No DC output at charger. LEDs are on as normal	DC fuse on charger has blown	Possible short circuit on your DC system or reverse polarity. Please check polarity of DC cables. Replace fuses. Turn off / on again.	Once fuses have been replaced, turn charger off, then on again. Live output voltage shall resume.
Good DC output at charger but not at battery.	Poor / no continuity between charger and battery.	DC cable fuse blown. Poor contact in cable. Check continuity.	Once connection between battery and charger is re-established. Charger shall begin charging immediately
LED Rotation	Charger too hot	Check cooling fan is working / unblocked. Disconnect DC loads. Turn charger off and let cool down. If charger is persistently getting too hot the charger may be too low power rating for what you require. Either batteries too large or loads.	Once cool, reapply power to charger.
LEDs Cycling / Rotating	Battery too hot (if you have temperature sensor connected). Battery charger shall trip if temperature sensor detects ~60DegC.	Elevated temperature at your battery terminal could be due to battery damage.  However, most likely, the heat is due to poor connection / contacts or loose contacts or both. Ensure the contacts / connections are tight and clean.	Once battery temperature sensor's temperature has dropped, charger shall continue charging.
LED Cycling / Rotating	Lithium battery too cold. If you have the charger in the lithium setting and the lithium battery terminal is at 0DegC or colder.	Lithium battery needs to be put into a warmer ambient temperature.  If you are confident the cells are warm but the terminals are cold because you have a heating pack in the lithium battery and your cells are protected by a good BMS then you can remove the temperature sensor altogether.	If terminal temperature elevates or temperature sensor removed, the charger resumes as normal.

