

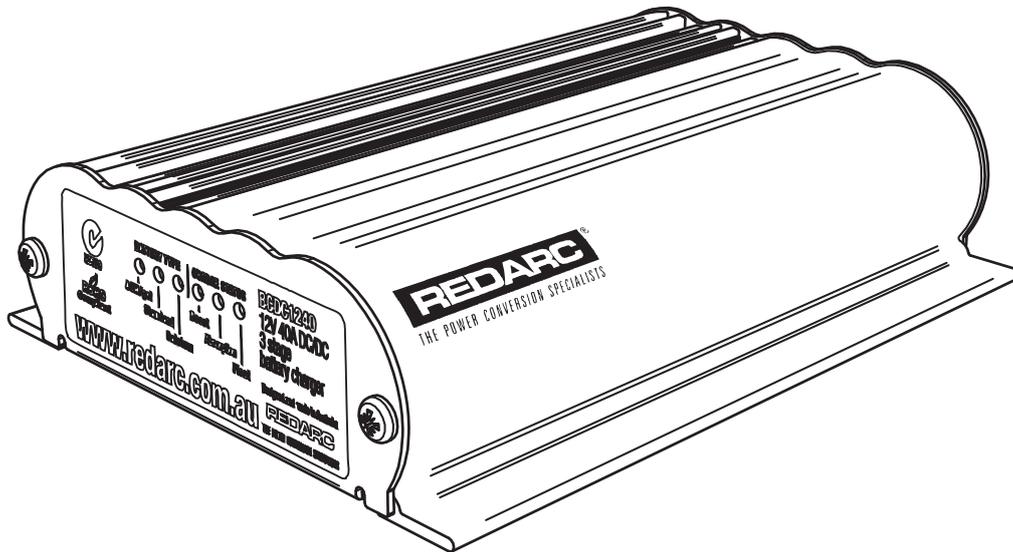


THE POWER OF

REDARC

40A In-vehicle 3-Stage 12V Battery Charger

BCDC1240-LV



THE BCDC1240-LV

The BCDC1240-LV In-vehicle Battery Charger features technology designed to charge your batteries to 100%, regardless of their type or size. By providing a unique charging profile to each specific battery type, the BCDC1240-LV In-Vehicle Battery Charger is able to achieve and maintain an optimal charge in your auxiliary battery, at all times. It is designed to operate with variable voltage alternators

The BCDC1240-LV In-vehicle Battery Charger also features a Maximum Power Point Tracking (MPPT) solar regulator, allowing you to deliver the maximum amount of power from your solar panels to your auxiliary battery.

WARNING & SAFETY INSTRUCTIONS

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 are supervised or have been instructed on how to use the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Do NOT disassemble the BCDC1240-LV - the internal circuitry contains hazardous voltages. Attempting to service the unit yourself may result in electric shock or fire and will void the unit warranty.

Do NOT use the BCDC1240-LV to charge non-rechargeable batteries. Doing so may result in harm to the user and/or damage to the BCDC1240-LV. Only use the BCDC1240-LV for charging Standard Lead Acid, Calcium content, Gel & AGM type 12V batteries.

All lead acid batteries produce harmful, explosive gases. The Battery should be mounted in a well ventilated area, as far as possible from any ignition sources. Do NOT smoke when in the vicinity of the battery under charge.

Battery acid is a harmful substance. Care should be taken when working with lead acid batteries, if the acid comes into contact with your eyes or skin, immediately wash the affected area with cold running water and seek medical assistance. Eye protection and gloves should be worn when handling lead acid batteries.

The BCDC1240-LV will achieve best results when proper battery maintenance is regularly performed. This includes but is not limited to checking water and specific gravity levels of the battery.

Warning! Check the manufacturers data for your battery and ensure that the 'Absorption' voltage of the profile you select does not exceed the manufacturers recommended maximum charging voltage. If the 'Absorption' voltage for your battery type is too high, please select another charging profile.

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Specifications

	BCDC1240-LV		
DC Input Voltage Range	9V-32V		
	Gel/AGM	Std Lead Acid	Calcium Content
Absorption Voltage	14.5V	14.9V	15.3V
Float Voltage	13.3V	13.3V	13.3V
No Load Current	<100mA		
Standby Current	<8mA		
Input Fuse Rating 12V/24V	50A/30A (Not supplied)		
Output Fuse Rating	50A (Not supplied)		
Output Power	600W		
Ambient Temperature	-20°C to +80°C		
Minimum O/P Battery Volts	4.2V		
Weight	680g		
Dimensions	150x120x37mm		
Warranty	2 years		
Standards	CE, C-Tick, AS/NZS CISPR11:2004		

1 PRODUCT FUNCTION

The BCDC1240-LV is a multi stage, 12V, 40A, DC-DC battery charger that operates from an input of either 12V nominal or a 12V nominal solar panel input. The input voltage of the BCDC1240-LV can be above, below or equal to the output voltage making it ideal for charging an auxiliary 12V battery where the distance from the main battery may cause a significant voltage drop. The BCDC1240-LV is also designed to isolate the main battery from the auxiliary battery, to avoid over-discharging the main battery and operate with variable voltage alternators

1.1 Alternator Input

To select the Alternator charging mode the BLUE 'Source Select' wire must be connected to Vehicle Ignition.

The output battery will only be charged when the alternator is running, and the vehicle ignition is ON, guaranteeing that the charger will not drain the input battery.

1.2 Solar Input

The BCDC1240-LV is also capable of charging the auxiliary 12V battery from a Solar source, Solar charging mode is selected at time of installation. The unit will accept an input directly from the solar panels and act as a MPPT Solar Regulator. To select the Solar charging mode the BLUE 'Source Select' wire can either be left disconnected or connected to GROUND.

1.3 Charging Algorithm

When the BCDC1240-LV is turned on, it will move into the bulk charging stage called Boost stage. Boost stage maintains a constant current until the battery voltage reaches its set point. The current in Boost stage may vary during operation in order to maintain safe operating temperature, or to limit the difference between input and output voltage.

The charger will then move to Absorption stage. This stage maintains a constant voltage level until the battery is full, after which the charger will enter float stage. Float stage maintains 13.3V on the output battery, keeping the battery topped up. This counteracts the battery's self discharging. When a load applied to the battery causes it to lose charge, the charger will move back into Boost.

1 PRODUCT FUNCTION

1.4 Turn On/Off Thresholds

	12V	Solar
Low voltage conditions (open circuit, tested every 100s)	Turn ON above 12V	Turn ON above 17.5V
	Turn OFF below 11.9V	Turn OFF below 17.2V
Low voltage conditions (loaded, constantly tested)	Turn OFF instantly below 8V	Turn OFF instantly below 8V
	Turn OFF after 20 secs below 9V	N/A
Over voltage shutdown	Turn ON below 15.5V	Turn ON below 28V
	Turn OFF instantly above 16V	Turn OFF instantly above 29V
	Turn OFF after 20 secs above 15.6V	Turn OFF after 20 secs above 28.2V
Under voltage shutdown	Shutdown if Output Battery < 4V	

1.5 External LED Indication

A flying lead output (GREEN wire) is provided to connect an external indicator LED, which can be mounted away from the unit, for example in the vehicle cabin. The positive lead of the LED will be connected to the indicator output wire (flying lead) provided, and the negative lead of the LED will be connected to the vehicle's ground. No external resistors are required.

The remote indicator LED will indicate charging state as described below:

LED State	Description
Off constant	Not charging
On constant	Charging or maintaining charge

1 PRODUCT FUNCTION

1.6 Display Panel

The BCDC1240-LV has three Battery Type Settings available. These settings enable optimal charging profiles for the auxiliary battery. The battery type selected is displayed via the LEDs on the front panel in the section 'Battery Type'. In addition to the battery type, the status of the charger is indicated via three LEDs. The 'Charging Status' shows when the unit is in BOOST, ABSORPTION or FLOAT. In order to give more information, the applicable LED will flash to indicate the output by the unit. The longer the flash, the more current the charger is putting out. If the LED is ON solid, then the unit is supplying a full 25A to the auxiliary battery.

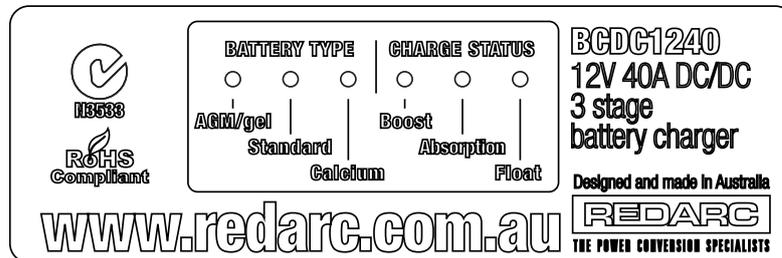


Figure 1.6.1 - BCDC1240-LV Front Panel

Standby mode is entered when the unit is not charging. In this mode, the Battery Type LED will blink approx once per second; the charging status LEDs will be off. In this mode, if the battery type wire is moved then the selected battery type will update.

1.7 Error Codes

In the event of a fault with the unit, installation, either battery or solar panel, both the External LED and ALL the LEDs on the unit will flash to indicate the fault type. Flashing sequences are described in the table below.

LED State	Description
1 flash (1 flash followed by 3.5 second off)	Internal Hardware Fault
2 flash (2 flash followed by 3.5 second off)	Reserved
3 flash (3 flash followed by 3.5 second off)	Unit over temp fault
4 flash (4 flash followed by 3.5 second off)	Output Battery Fault (Volts too high)
5 flash (5 flash followed by 3.5 second off)	Input under voltage (Battery)
6 flash (6 flash followed by 3.5 second off)	Input over voltage (Battery or Solar panel)
7 flash (7 flash followed by 3.5 second off)	Reverse polarity

2 INSTALLATION

- 1 Mount the unit to a flat surface close to the auxiliary battery and away from any heat sources.

NOTE: The unit will operate optimally below 55°C with good airflow. At higher temperatures the unit will de-rate output current.

- 2 Wire into vehicle as per the applicable diagram on the next pages, and following the steps below.

The BCDC1240-LV is connected using 6 wires, listed below:

- Source Select Blue
- Battery Type Orange
- Remote Indicator Green
- Input Battery Positive Red 50A/30A* Fuse (not supplied)
- Common Ground Black
- Output Battery Positive Brown 50A Fuse (not supplied)

* Current rating is for 24V input voltage.

1. Wire the 'Common Ground' wire to a ground point that is common to both the Start battery (or the Solar Input Ground wire) and the Auxiliary battery to be charged. This point MUST be on the chassis of the vehicle, on the chassis of the trailer/camper/caravan, NOT directly wired to the main battery.
2. Wire the 'Output Battery Positive' to the Auxiliary battery positive terminal. Ideally the BCDC unit should be a maximum of 1 metre in cable length from the battery positive terminal, and should be wired with a minimum of 7.71mm² or 8 B&S cable.
3. Wire the 'Input Battery Positive' wire to the Start battery positive terminal via a 60A N/O ignition controlled relay, or the Solar Input Positive wire, depending on your install. Below is a table outlining the required cable size for a given cable install length. Always choose a wire diameter equal to or greater than what is specified below.

Cable Install Length (m)	Minimum Wire Size (mm ²)	Recommended Wire Size (mm ²)	Closest (BAE, B&S, AWG)
1 - 5	6	13.56	6
5 - 9	6	20.28	4

4. Wire the 'Source Select' wire according to your installation requirements. For a setup charging from a 12V alternator, connect this wire to the 'Vehicle Ignition'. For a Solar only charging setup, connect this wire to GROUND or just leave it disconnected. This wire is monitored at all times.
5. Wire the 'Battery Type' wire according to the type of Auxiliary battery you have installed. This wire is monitored when the charger is not charging.

Connection	Battery type (Orange)	Source select (Blue)
12V Input positive	 Calcium	 Alternator charge
 Ground	 Standard Lead Acid	 Solar charge
N/C Not connected	 AGM or Gel	 Solar charge

NOTE: The unit will operate optimally below 55°C with good airflow. At higher temperatures the unit will de-rate output current.

IMPORTANT NOTE: Battery type selection refers to a typical installation where the battery and unit are mounted in a low to mid temperature situation. For situations of higher temperature such as under the bonnet or in a caravan battery box, a softer profile (eg Std Lead Acid instead of Calcium) may need to be selected to avoid damage to the battery.

2.1 Wiring

The heavy gauge wires on the BCDC1240-LV unit carry peak currents of up to 50 Amps, and it is important to make a good, low resistance, electrical connection that will not degrade over time. Failure to make a good, reliable contact may result in breakdown of the wire insulation and cause a short circuit, or worst case a fire. We recommend that this activity be undertaken by an appropriately trained person.

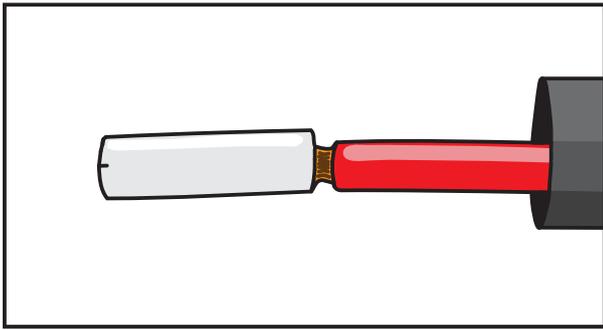
Redarc recommends using a soldered butt splice crimp connection that is covered with heatshrink. The process should be to feed the heatshrink over the wires, crimp the wires into the butt splice, then solder the wires on the butt splice, and finally heat the heatshrink. Do not solder the wire before crimping.

Redarc does not recommend using standard red/ blue/yellow blade connections as they are not rated for either the current or gauge of wire supplied on the unit. The appropriate sized butt splice should be selected: for example if 8AWG wires are used to connect the unit then an 8AWG butt splice should be used. If the wire gauge brought up to the unit is larger than the 8AWG, then it is recommended to use a butt splice that has two different size entries, each matching the respective wire size. Various butt splices are available from auto electrical suppliers.

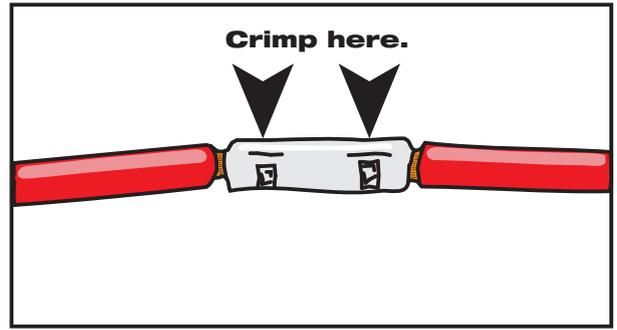
Crimping provides good mechanical connection, soldering provides a long lasting electrical connection and forming of the heatshrink will prevent any shorting/contact with your vehicle chassis.

The term 'crimping' refers to a method of firmly attaching a terminal or contact to the end of an electrical conductor by pressure forming or reshaping a metal barrel onto the connector. The forming of a satisfactory crimp is dependent upon the correct combination of conductor, crimp barrel and crimping tool. When the correct combination of equipment is employed, a crimp that has both good electrical and mechanical characteristics will be formed.

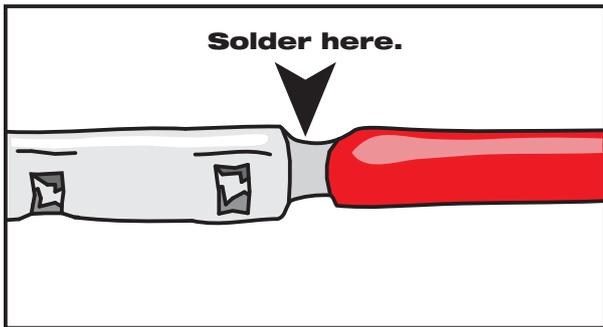
Butt splices are used to dress and terminate multiple conductors of the same or different gauges in an end-to-end or series configuration.



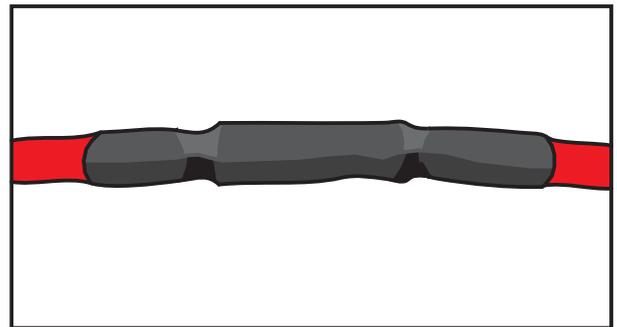
Slip heatshrink over wire and insert wires into butt splice. Keep heatshrink away from joint until after soldering is complete and has cooled.



Crimp both wires to the butt splice using indent type crimpers.



Solder the wires to the butt splice. Ensure that a good connection is made.



Wait for the butt splice to cool, slip heatshrink over the joint and heat.

Figure 2.1 - Ensuring a good wiring connection

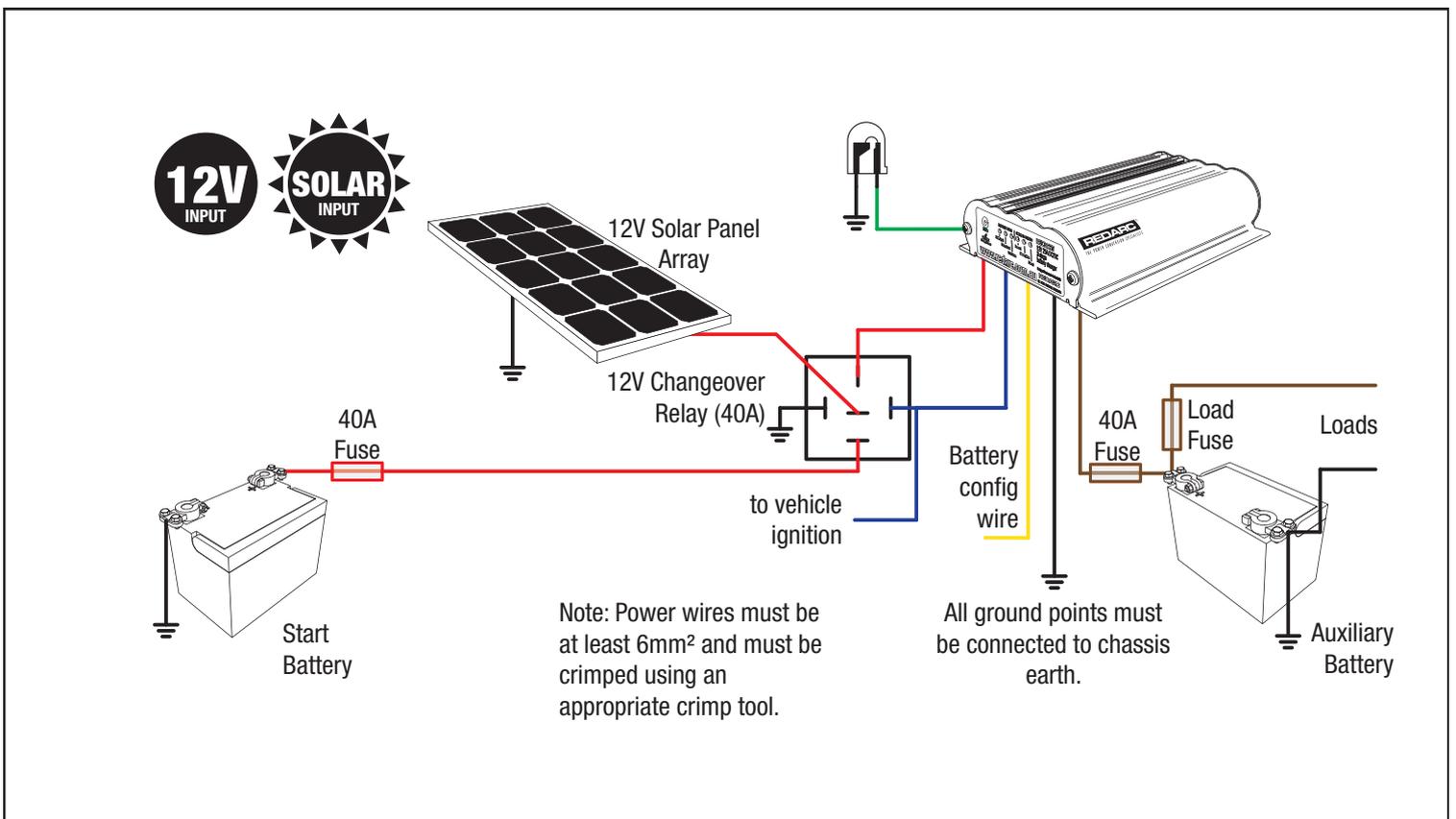


Figure 2.2 - Standard setup for a 12V Start Battery & 12V Solar Array

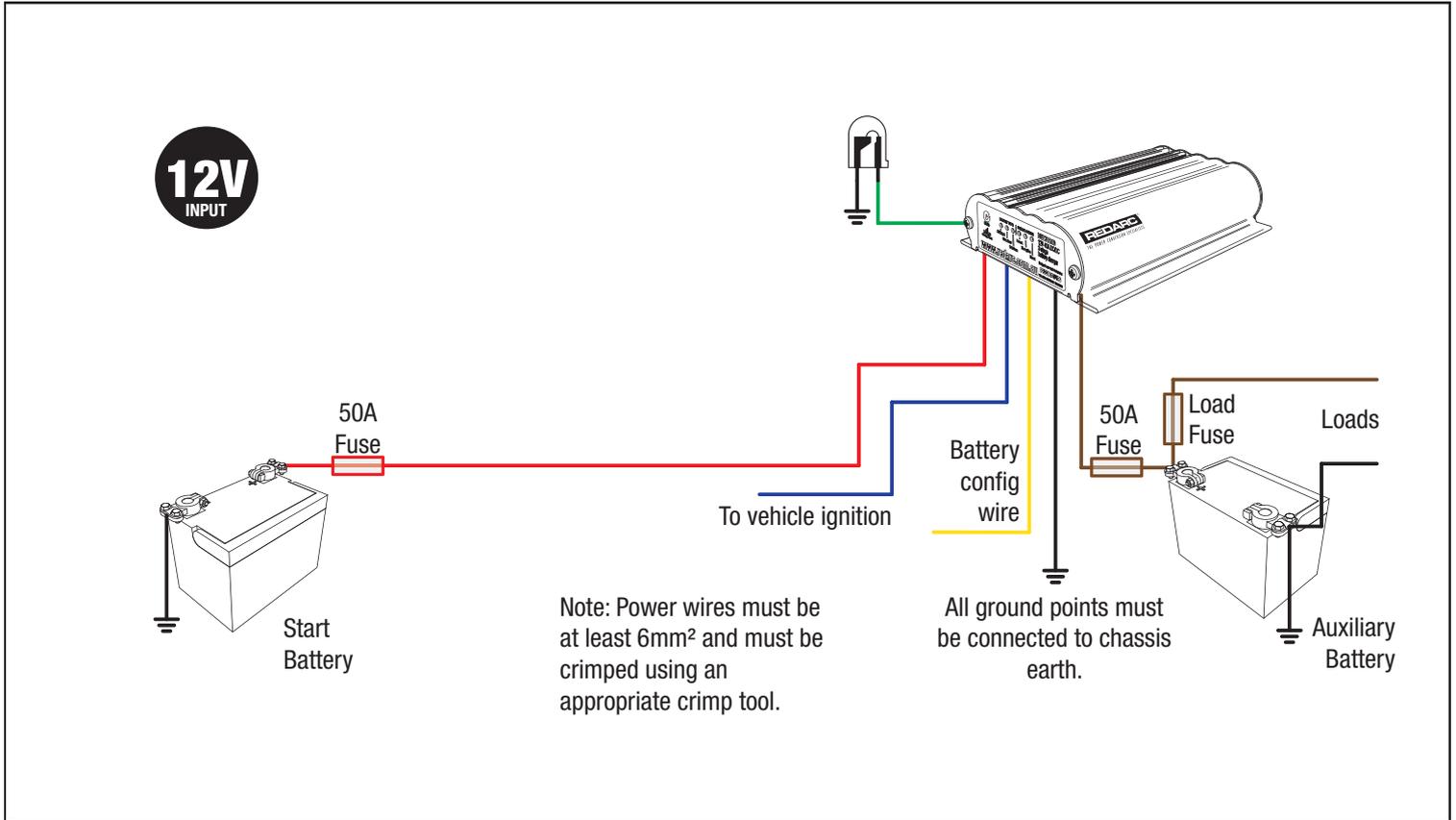


Figure 2.3 - Standard setup for a 12V Start Battery

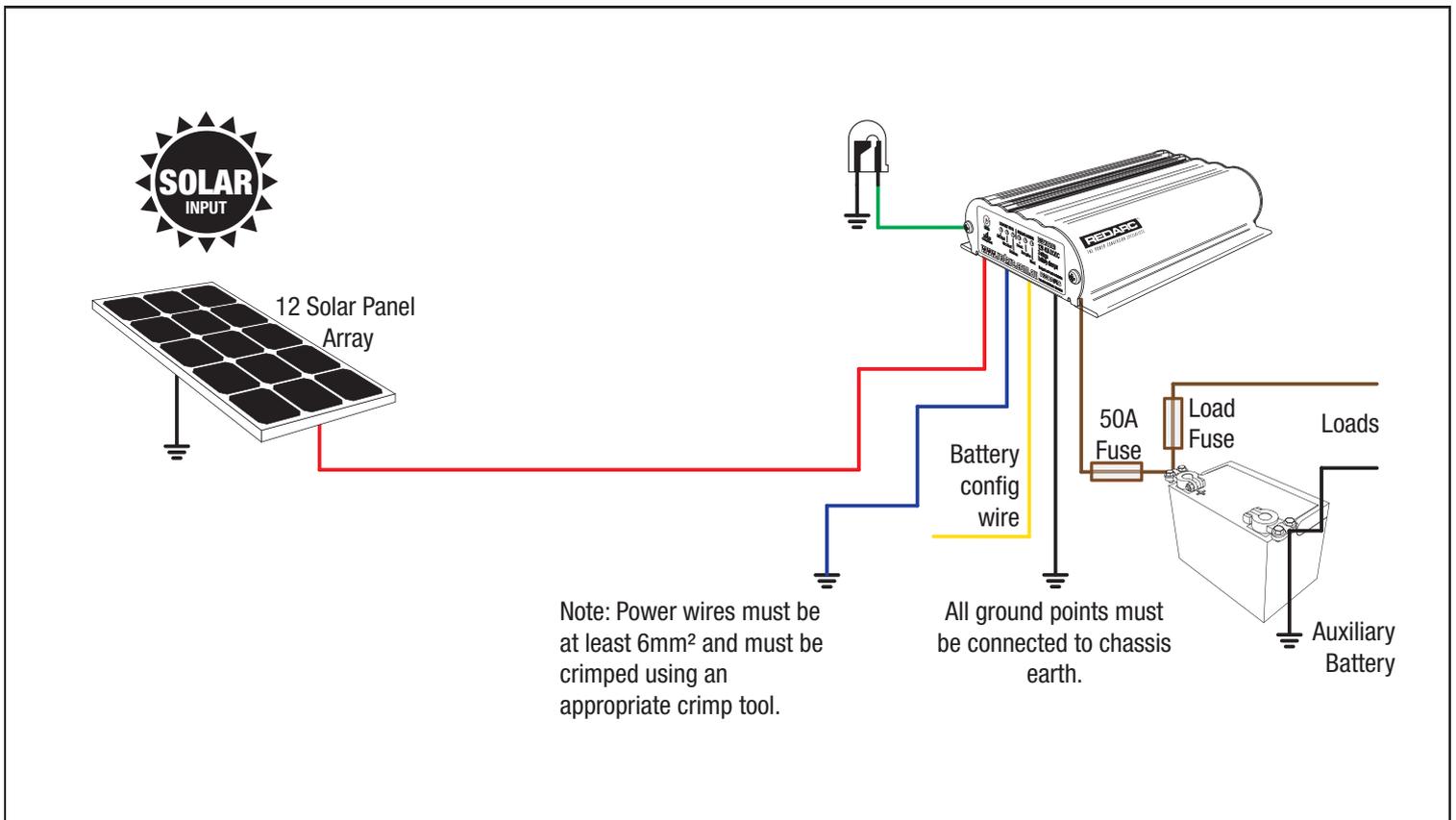


Figure 2.4 - Standard setup for a 12V Solar array

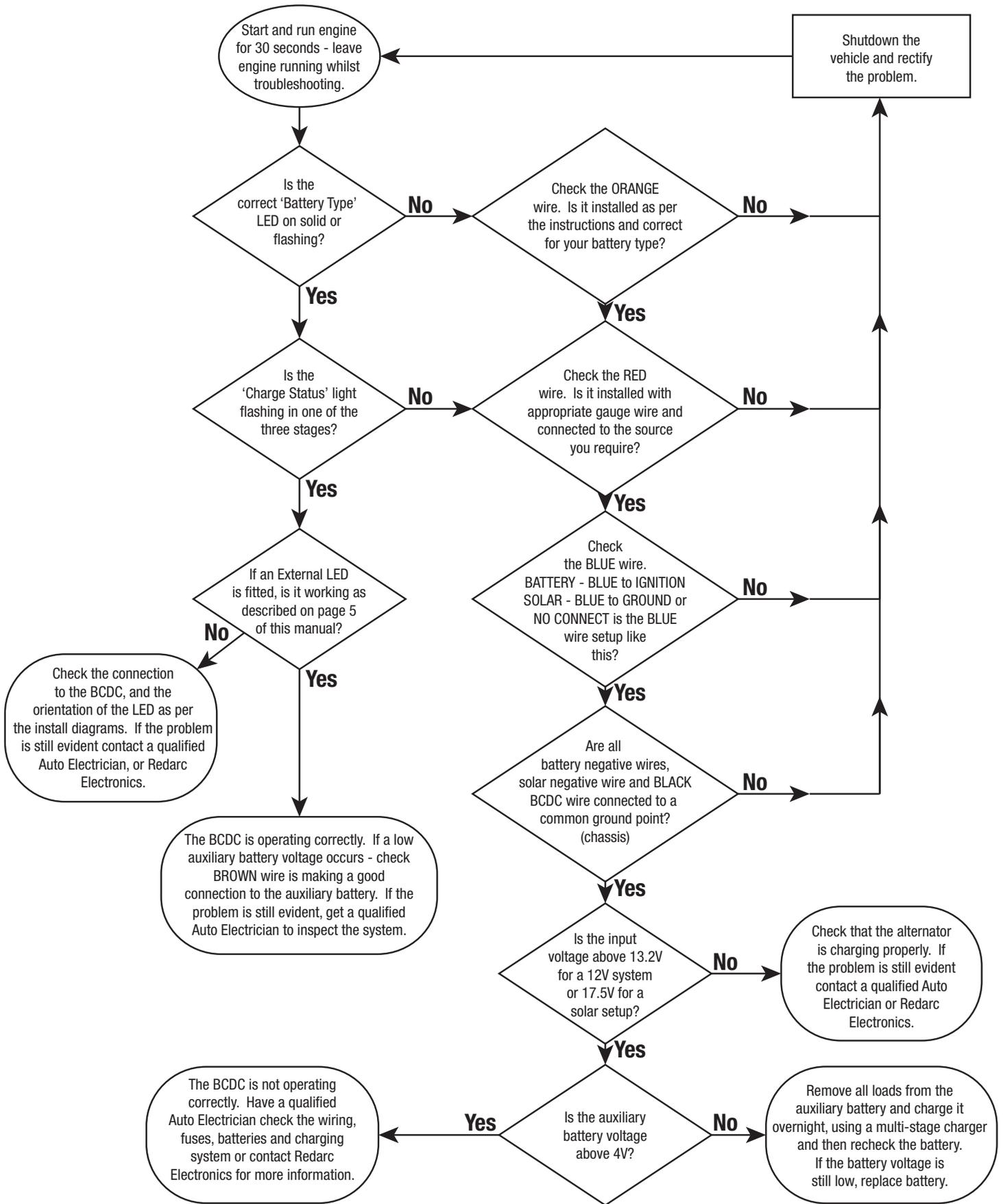


Figure 3.1 - Standard BCDC1240-LV Troubleshooting Guide

4 FREQUENTLY ASKED QUESTIONS

- Q** The BCDC turns ON at 12.0V and OFF at 11.9V, but you say it operates down to 9V, explain?
- A** The BCDC will turn OFF for a split second every 100 seconds to measure the unloaded voltage at the battery. When the BCDC turns off it is not drawing any load from the start battery, no load means that there is no voltage drop over the cable run. This allows the BCDC to measure the actual battery voltage, or the **voltage at the battery**. If this actual battery voltage is below 12.7V, the BCDC will turn OFF. At any other time during the charging process, if the voltage at the **BCDC** drops below 9V the BCDC will turn OFF.
- Q** How does the BCDC charge an Auxiliary battery at 14V when it only gets 9V in?
- A** The BCDC can act as both a reducer and a booster, so it can operate from a voltage of above, equal to or below the desired output voltage. The unit is also microprocessor controlled allowing it to output a Redarc proprietary charging algorithm independent of the input. This allows the unit to charge specific to the battery type even if the input voltage is low due to voltage drop.
- Q** Where should I mount the BCDC Unit?
- A** The BCDC should be mounted as close as possible to the battery being charged (generally called the Auxiliary or House battery). If the Auxiliary battery is located under the bonnet, pick a location for the BCDC that is close to the battery and away from any direct engine heat. If the BCDC is to be mounted into a Caravan or Camper, near or in the battery compartment is generally the best position. It is also a good idea to mount the BCDC to a metal surface if possible to ensure optimal heat dissipation, though this is not crucial.
- Q** What does the charger do if the temperature around it rises above its operating temperature?
- A** As the temperature of the BCDC rises above a certain level the current capacity of the output is decreased gradually in order protect both the battery and the BCDC unit.
- Q** If I use the BCDC to charge my auxiliary battery do I still need to install a battery isolator?
- A** The BCDC incorporates the functionality of a battery isolator, it will turn ON and start charging when it senses that the vehicle has started and similarly it will turn OFF when the vehicle is turned OFF.
- Q** I've heard that you shouldn't charge 2 batteries of different chemistries from the same source, will I have any problems charging my AGM or Gel auxiliary battery from my Lead Acid start battery?
- A** The BCDC does not 'link' the batteries together like a battery isolator does, it is a DC-DC battery charger. The output from the unit is tailored specifically to the selected output battery type, and therefore allows the optimal charging of the auxiliary battery, no matter what chemistry your start battery is.
- Q** My BCDC is setup for 12V Alternator input but will not start when the vehicle is turned On, I've followed the trouble shooting guide and the setup is fine, what's the problem?
- A** The most likely cause of this issue is that the BCDC is somehow 'stuck' in 24V mode. Try removing the 'Source Select' (Blue) wire and reconnecting it. If the problem still exists please contact Redarc Electronics.

5 TWO YEAR PRODUCT WARRANTY

Over the last three decades our company has established a reputation as the power conversion specialist.

A 100% Australian-owned company, we have met the needs of customers in transport and other industries through exciting, innovative thinking.

We believe in total customer satisfaction and practice this by offering our customers:

- Technical advice free of jargon and free of charge
- Prompt turnaround of orders throughout Australia and globally
- Friendly, personalised, professional service and product support

In the unlikely event that a technical issue arises with a Redarc product, customers are encouraged to initially contact the Redarc Technical Support Team on (08) 8322 4848 or power@redarc.com.au for prompt and efficient diagnosis and product support.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

The benefits of this Warranty are in addition to other rights and remedies available at law in respect of the Products and shall not derogate from any applicable mandatory statutory provisions or rights under the Australian Consumer Law.

Redarc Electronics Pty Ltd at the Redarc Trust trading as Redarc Electronics ("**Redarc**") offers a warranty in respect of its Products where the Products are purchased from an authorised distributor or reseller of Redarc by a person ("**Purchaser**"), on the terms and conditions, and for the duration, outlined below in this document ("**Warranty**").

1. In this Warranty, the term **Products** means:
 - 1.1 all products manufactured or supplied by Redarc (excluding its solar products which are covered by Redarc's Solar Product Warranty); and
 - 1.2 any component of or accessory for any product in clause 1.1 manufactured or supplied by Redarc.

Offer and duration of product warranties

2. Redarc warrants that its Products will be free, under normal application, installation, use and service conditions, from defects in materials and workmanship affecting normal use, for **2 years** from the date of purchase (**Warranty Period**).
3. Where a Product malfunctions or becomes inoperative during the Warranty Period, due to a defect in materials or workmanship, as determined by Redarc, then subject to further rights conferred by the Australian Consumer Law on the Purchaser, Redarc will, in exercise of its sole discretion, either:
 - 3.1 repair the defective Product;
 - 3.2 replace the defective Product; or
 - 3.3 provide a refund to the Purchaser for the purchase price paid for the defective Product,without charge to the Purchaser.
4. The warranty given by Redarc in clause 3 covers the reasonable costs of delivery and installation of any repaired or replaced Products or components of Products to the Purchaser's usual residential address notified to Redarc, together with the reasonable costs of removal and return of any Products determined by Redarc to be defective.
5. If the Purchaser incurs expenses of the nature referred to in clause 4 in the context of making a claim pursuant to this Warranty that is accepted by Redarc, the Purchaser will be entitled to claim for reimbursement of those expenses which Redarc determines, in exercise of its sole discretion, to be reasonably incurred, provided that the claim is notified to Redarc in writing at the postal address or email address specified in clause 21 and includes:
 - 5.1 details of the relevant expenses incurred by the Purchaser; and
 - 5.2 proof of the relevant expenses having been incurred by the Purchaser.

Exclusions and limitations

6. This Warranty will not apply to, or include any defect, damage, fault, failure or malfunction of a Product, which Redarc determines, in exercise of its sole discretion, to be due to:
 - 6.1 normal wear and tear or exposure to weather conditions over time;
 - 6.2 accident, misuse, abuse, negligence, vandalism, alteration or modification;
 - 6.3 non-observance of any of the instructions supplied by Redarc, including instructions concerning installation, configuring, connecting, commissioning, use or application of the Product, including without limitation choice of location;
 - 6.4 failure to ensure proper maintenance of the Product strictly in accordance with Redarc's instructions or failure to ensure proper maintenance of any associated equipment or machinery;
 - 6.5 repairs to the Product that are not strictly in accordance with Redarc's instructions;
 - 6.6 installation, repairs or maintenance of the Product by, or under the supervision of, a person who is not a qualified auto electrician or technician, or if non-genuine or non-approved parts have been fitted;
 - 6.7 faulty power supply, power failure, electrical spikes or surges, lightning, flood, storm, hail, extreme heat, fire or other occurrence outside the control of Redarc;
 - 6.8 use other than for any reasonable purpose for which the Product was manufactured;
 - 6.9 any indirect or incidental damage of whatever nature outside the control of Redarc.
7. Warranty claims in respect of a Product must be made in writing to Redarc at the postal address or email address specified in clause 21 within the Warranty Period. Such claims must include the following:
 - 7.1 details of the alleged defect or fault and the circumstances surrounding the defect or fault;
 - 7.2 evidence of the claim, including photographs of the Product (where the subject of the claim is capable of being photographed);
 - 7.3 the serial number of the Product, specified on the label affixed to the Product; and
 - 7.4 proof of purchase documentation for the Product from an authorised distributor or reseller of Redarc, which clearly shows the date and place of purchase.The return of any Products without the prior written instructions of Redarc will not be accepted by Redarc.

8. Without limiting any other clause in this Warranty, Redarc has the right to reject any Warranty claim made by a Purchaser pursuant to this Warranty where:
 - 8.1 the Purchaser does not notify Redarc in writing of a Warranty claim within the Warranty Period;
 - 8.2 the Purchaser does not notify Redarc in writing of a Warranty claim within 1 month of becoming aware of the relevant circumstances giving rise to the claim, so that any further problems with the Product are minimised;
 - 8.3 the serial number of the Product has been altered, removed or made illegible without the written authority of Redarc;
 - 8.4 the Purchaser is unable to provide proof of purchase documentation in accordance with clause 7.4 or evidence that the Product was properly installed and removed (if relevant), and that proper maintenance has been performed on the Product, by, or under the supervision of, a qualified auto electrician or technician, in accordance with the instructions of Redarc.
9. If the Product is found to be working satisfactorily on return to Redarc or upon investigation by Redarc, the Purchaser must pay Redarc's reasonable costs of testing and investigating the Product in addition to shipping and transportation charges. Where Redarc is in possession of the Product, the Product will be returned to the Purchaser on receipt of the amount charged.
10. Any replaced Products or components of Products shall become the property of Redarc.
11. Redarc may, in exercise of its sole discretion, deliver another type of Product or component of a Product (different in size, colour, shape, weight, brand and/or other specifications) in fulfilling its obligations under this Warranty, in the event that Redarc has discontinued manufacturing or supplying the relevant Product or component at the time of the Warranty claim, or where such Product or component is superior to that originally purchased by the Purchaser.

Other conditions of Warranty

12. If the Purchaser acquired a Product for the purpose of resupply, then this Warranty shall not apply to that Product.
13. In particular, the sale of a Product via an online auction, online store or other internet website by a party that is not an authorised distributor or reseller of the Product will be deemed to be a resupply within the meaning of the Australian Consumer Law and will render this Warranty void, as Redarc has no control over the storage, handling, quality or safety of Products sold by such persons.
14. A Purchaser shall only be entitled to the benefit of this Warranty after all amounts owing in respect of the Product have been paid.
15. While Redarc warrants that the Products will be free from defects in materials and workmanship in the circumstances set out in this Warranty, to the maximum extent permitted by law Redarc does not warrant that the operation of the Products will be uninterrupted or error-free.
16. To the maximum extent permitted by law, Redarc's determination of the existence of any defect and the cause of any defect will be conclusive.
17. Spare parts or materials for the Products are guaranteed to be available for a period of at least 2 years after purchase of the Products.
18. The agents, officers and employees of any distributor or reseller of the Products and of Redarc are not authorised to vary or extend the terms of this Warranty.
19. Redarc shall not be responsible or liable to the Customer or any third party in connection with any non-performance or delay in performance of any terms and conditions of this Warranty, due to acts of God, war, riots, strikes, warlike conditions, plague or other epidemic, fire, flood, blizzard, hurricane, changes of public policies, terrorism and other events which are beyond the control of Redarc. In such circumstances, Redarc may suspend performance of this Warranty without liability for the period of the delay reasonably attributable to such causes.
20. If a clause or part of a clause in this Warranty can be read in a way that makes it illegal, unenforceable or invalid, but can also be read in a way that makes it legal, enforceable and valid, it must be read in the latter way. If any clause or part of a clause in this Warranty is illegal, unenforceable or invalid, that clause or part is to be treated as removed from this Warranty, but the rest of this Warranty is not affected.

Redarc's contact details

21. Redarc's contact details for the sending of Warranty claims under this Warranty are:
Redarc Electronics Pty Ltd
23 Brodie Road (North), Lonsdale SA 5160
Email: power@redarc.com.au
Telephone: +61 8 8322 4848

THE POWER OF

REDARC

Free technical assistance!

please contact

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