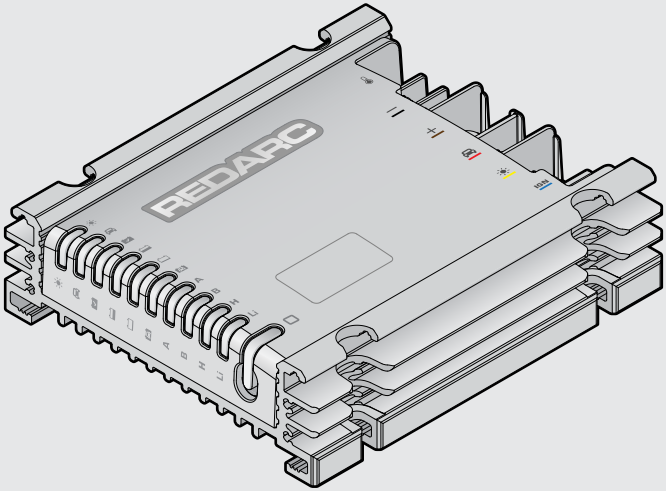
THE POWER OF
REDARC

BCDC ALPHA®

12 V 25 A / 50 A DC-DC Charger with
Bluetooth® and Start Battery Charging

MODELS:

- **BCDC12025B**
- **BCDC12050B**



AUSTRALIAN MADE®

BCDC ALPHA®

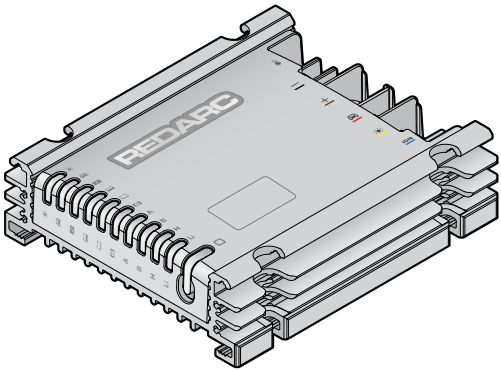
12 V 25 A / 50 A DC-DC Charger with Bluetooth® and Start Battery Charging

The BCDC Alpha charges all common 12 V automotive battery types including standard and heated lithium from both solar panels and the vehicle start battery. It is equipped with screw terminals for easy installation, and has a push-button interface for simple operation.

The BCDC Alpha prioritises charging from solar before supplementing from the vehicle start battery to lighten the load on your alternator and maximise the collection of free solar energy, with an option for excess solar energy to then top-up the vehicle start battery.

Wirelessly pair to the BCDC Alpha using the REDARC Configurator and RedVision® App on your smartphone to configure, monitor and control your system.

The BCDC Alpha also features the capability to seamlessly revive and charge a fully flattened lithium battery.



Get the Free Configurator App

Configure the settings of the BCDC Alpha using your smartphone via Bluetooth®.

Get the Free RedVision® App

Monitor and control your System using your smartphone via Bluetooth®.

The RedVision® App and the Configurator App and their interactions with the BCDC Alpha have not been tested on all smartphone models. Visit the application pages within your smartphone's App store to view compatibility details.

CONTENTS

For the latest version of this document and any available translations, visit the REDARC website:
www.redarcelectronics.com

WARNINGS & SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS — this manual contains important safety instructions. Do not operate the system unless you have read and understood this manual.

REDARC recommends that the BCDC Alpha referenced in this manual be installed by a suitably qualified person.

Disclaimer: REDARC accepts no liability for any injury, loss or property damage which may occur from the improper or unsafe installation or use of its products.

PERSONAL SAFETY PRECAUTIONS

To assist with the safe operation and use of the system:

a. Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.

b. If battery acid contacts your skin or clothing, remove the affected clothing and wash the affected area of your skin immediately with soap and water. If battery acid enters your eye, immediately flood the eye with running cold water for at least 10 minutes and seek medical assistance immediately.

SAFETY MESSAGE CONVENTIONS

Safety messages in this manual include a signal word to indicate the level of the hazard as follows:

⚠ **WARNING:** Indicates a potentially hazardous situation which could result in death or serious injury to the operator or to bystanders.

⚠ **CAUTION:** Indicates a potentially hazardous situation which may result in moderate or minor injury to the operator or to bystanders.

NOTICE: Indicates a situation that may cause equipment damage.

⚠ WARNING

1. **RISK OF EXPLOSIVE GASES: Working in vicinity of a lead-acid battery is dangerous. Lead-acid batteries generate explosive gases during normal operation. For this reason, it is of utmost importance that you follow the instructions when installing and using the BCDC Alpha.**
2. **NEVER smoke or allow a spark or flame in vicinity of battery or engine, this may cause the battery to explode.**
3. **Any changes or modifications not expressively approved by the grantee could void the user's authority to operate this equipment.**

⚠ CAUTION

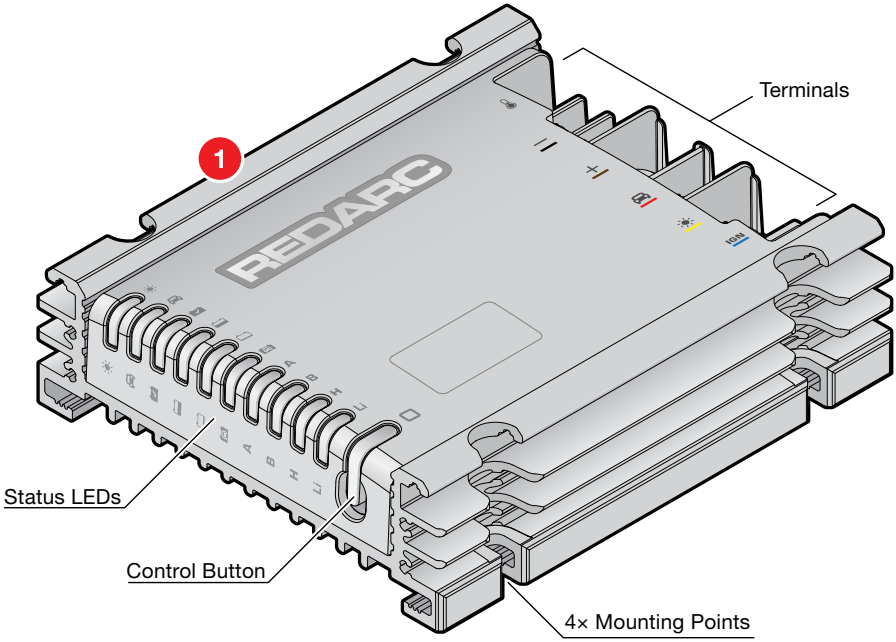
1. Do not modify or disassemble the BCDC Alpha under any circumstances. All faulty Units must be returned to REDARC for repair. Incorrect handling or reassembly will result in voiding the product's waterproof rating, may result in a risk of electric shock or fire and may void the product's warranty.
2. The BCDC Alpha should not be used 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 BCDC Alpha.
3. The BCDC Alpha is not intended to supply power to a low voltage electrical system other than to charge a battery.
4. Check the manufacturer's data for your battery and ensure that the 'Maximum' voltage of the profile you select does not exceed the manufacturer's recommended maximum charging voltage. If the 'Maximum' voltage is too high for your battery type, select another charging profile.
5. Check the manufacturer's data for your battery and ensure that the BCDC Alpha's 'Maximum Output Current' does not exceed the manufacturer's recommended maximum. If the 'Maximum Output Current' is too high for your battery, reduce it by configuring the "Max Charge Current" setting in the Configurator App or via the Control Button.
6. Only use the BCDC Alpha for charging Standard Automotive Lead Acid, Calcium Content, Gel, AGM, SLI, Deep Cycle, Heated or Standard Lithium Iron Phosphate ($LiFePO_4$) type 12 V batteries.
7. When using the BCDC Alpha to charge a Lithium Iron Phosphate ($LiFePO_4$) battery, only use batteries that feature an inbuilt battery management system which includes cell balancing, under and over voltage protection.
8. The Heated Lithium (H) charging profile should only be used with lithium batteries that feature a functioning heating element. If unsure, the Standard Lithium (Li) charging profile must be used. Using the wrong charging profile may damage your lithium battery.
9. The Battery Type setting must match your auxiliary battery's chemistry. Noticeable oscillations between Boost and Absorption stages may indicate an incorrect Battery Type setting. If unsure which settings to use, then use the AGM/Gel setting.
10. If the BCDC Alpha's default input current rating (28 A or 55 A) exceeds the spare capacity of the vehicle electrical system or alternator, reconfigure the Vehicle Input Current Limit setting to be within available capacity.
11. Cable and fuse sizes are specified by various codes and standards which depend on the type of vehicle the battery is installed in. Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to the BCDC Alpha or other equipment installed in the system. The installer is responsible for ensuring that the correct cable and fuse sizes are used when installing this BCDC Alpha.
12. A maximum of two lugs can be connected to each of the Terminals on the Main Unit. Installing more than two may damage the Main Unit and/or other equipment installed in the system and could lead to short circuits between terminals. If you need to connect more than two lugs, use a busbar.
13. Before performing work or maintenance on the auxiliary electrical system (which includes the Vehicle Start Battery, Auxiliary Battery, and Solar Panels), isolate all input and output sources of power to the electrical system and charger. Isolate the system by removing fuses or by activating isolation switches (if fitted). There is a risk electric shock and fire if all sources of power are not completely isolated before carrying out work.
14. The BCDC Alpha is intended for use in vehicles with Negative Ground. The advice and diagrams in this manual are not applicable to use in positively grounded vehicles, and so may lead to damage to the BCDC Alpha and associated components.

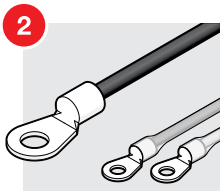
NOTICE

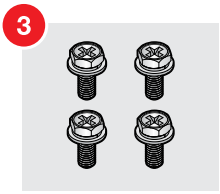
1. Keep the BCDC Alpha away from major heat sources (e.g. hot exhaust), high voltage, and avoid exposure to sunlight for long periods of time.
2. It is the installer's responsibility to ensure their installation complies with any applicable legal and regulatory requirements.
3. For fastening lugs to the Main Unit Terminals, only use the supplied M3 × 8 mm / M5 × 10 mm Hex Head Phillips Screws or equivalent. Using longer screws may lead to poor electrical connection or may damage the Main Unit.

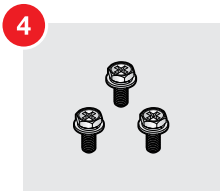
PRODUCT OVERVIEW

KIT CONTENTS









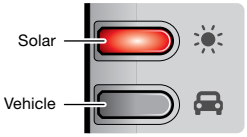
Ref.	Part Description	Qty.
1	Main Unit	1
2	Temperature Sensor Cable, 2 m (6'7")	1
3	M5 × 10 mm Hex Head Phillips Screw	4
4	M3 × 8 mm Hex Head Phillips Screw	3

STATUS LEDS

The Status LEDs on the Main Unit display the status of the system and its settings.

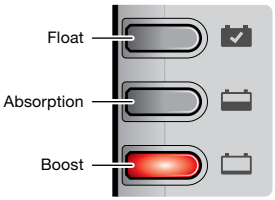
SOLAR AND VEHICLE LEDS

The Solar and Vehicle LEDs illuminate when the corresponding input is in use. Input from solar is prioritised to lighten the load on your vehicle's alternator and maximise the collection of free solar energy.



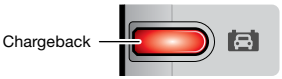
CHARGING STAGE LEDS

The Charging Stage LEDs show the current charging stage that the Main Unit is in when charging the auxiliary battery. See page 31 for information about each charging stage.



CHARGEBACK LED

The Chargeback LED illuminates when the Start Battery Charge Mode (page 27) is enabled and active, or when Start Battery Recovery (page 31) is in progress.

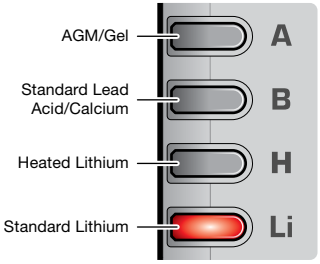


CHARGE PROFILE LEDS

The BCDC Alpha can charge AGM/Gel **(A)**, Standard Lead Acid/ Calcium **(B)**, Heated Lithium **(H)** and Standard Lithium **(Li)** batteries.

Configure the Charge Profile via Configurator App **Battery Type** setting or via the Control Button on the Main Unit.

NOTE: Before configuring the charge profile/battery type, refer to the charging specifications stated by the battery manufacturer and see page 36 for voltage specifications.

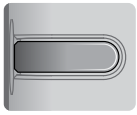


CONTROL BUTTON

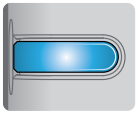
The Control Button controls the BCDC Alpha and can be used to configure the essential settings. Note that there are additional settings that can be configured using the REDARC Configurator App (see page 23).

To wake up the BCDC Alpha, press and hold the Control Button until it turns blue. Press the Control Button again to cycle to the next setting, which is indicated by the LED colour. To enter the selected setting, **press and hold the Control Button until the LED remains solid on**.

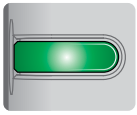
The Control Button LED will time out after 10 seconds of inactivity.



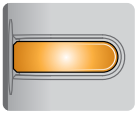
Standby (off)



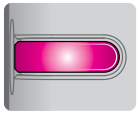
Bluetooth (blue)
see page 23



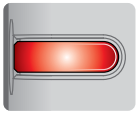
Start Battery Recovery (green)
see page 31



Max Charge Currents (orange)
see page 26



Battery Type (pink)
see page 28

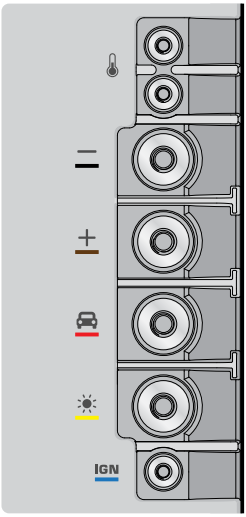


Fault (red)
see page 33

TERMINALS

The BCDC Alpha has female screw terminals for easy connection of the input and output cables.

Refer to "Connect Cables to the Main Unit" (page 15) for torque information.



Battery Temperature Sensor (M3)
Monitors the temperature of the auxiliary battery (page 16).

Ground (M5)
Connects to the common ground (page 18).

Auxiliary Battery (M5)
Connects to the auxiliary battery positive (+) terminal (page 16).

Start Battery (M5)
Connects to the start battery positive (+) terminal (page 18).

Solar (M5)
Connects to the solar panel positive (+) wire (page 18).

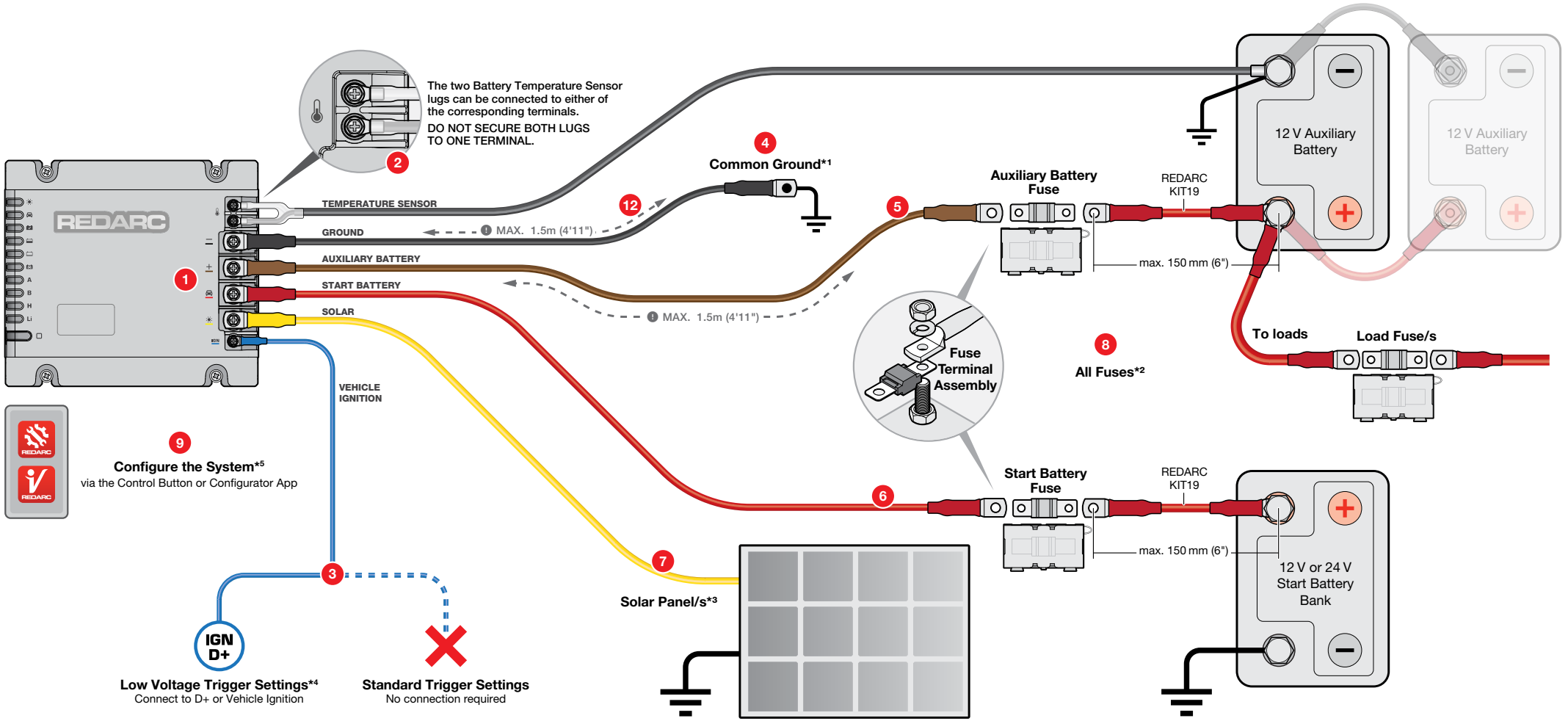
Vehicle Ignition (M3)
Connects to an ignition signal for vehicles with smart alternators (page 16).

TYPICAL BCDC ALPHA SETUP

WIRING DIAGRAM

This wiring diagram shows a typical system configuration. If unsure, contact REDARC Technical Support for advice on your individual system requirements.

1 Indicates the order of installation.



*1 Fuses must be suitably rated for the cable gauge used. MIDI type fuses are recommended (see page 11).

*2 Do not connect regulated solar panels, the BCDC Alpha has an inbuilt MPPT regulator.

*3 All components in your system must share a common electrical ground.

*4 If required, connect the **Vehicle Ignition** cable to D+ or ignition switched fuse in one of the vehicle's fuse boxes, located in either the engine compartment or vehicle cabin (see page 9 and page 16).

*5 Essential settings can be configured via the Control Button, while additional settings are available via the Configurator App.

SYSTEM PLANNING

WHAT YOU WILL NEED

TOOLS

The tools listed may be required for mounting and wiring the BCDC Alpha:

- Screwdriver set
- Spanner set
- Power drill
- Side/Cable cutters
- Lug/Ring terminal crimping tool
- Heat gun

CONSUMABLES

Components not included with the BCDC Alpha may be required for mounting, wiring connections and cable management, including:

- Mounting fasteners
- Cables/wires
- Lug/Ring terminals
- Busbar/s
- Electrical tape
- Heat shrink
- Cable ties
- Conduit/Split tubing
- P-Clips

CONSIDERATIONS BEFORE INSTALLING

COMMON GROUND REQUIREMENTS

The Main Unit and all other devices in your setup must share a common electrical ground point for correct system operation. This can be achieved by connecting all grounds to a common ground busbar (page 17) or by a good quality connection to the vehicle chassis (if appropriate).

Using a common ground busbar

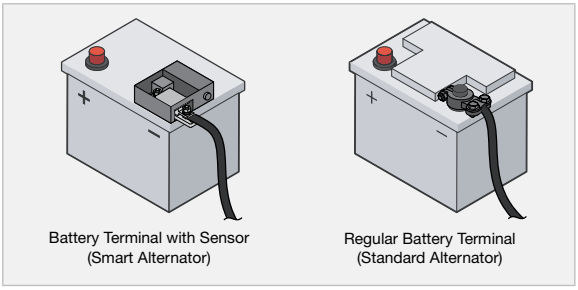
Consider the location of the busbar, ensuring it's mounted in a central location to avoid excessive cable runs. The common ground busbar must be capable of carrying all current loads — see "Maximum Expected Currents" (page 10) for further information.

Using the vehicle's chassis

Good quality electrical connections to a chassis can only be achieved if the connection is free of paint, protected against corrosion, and has a suitable fastener. The common ground must have a robust electrical connection to the battery earthing point.

IDENTIFYING YOUR VEHICLE'S ALTERNATOR TYPE

If you have a variable-voltage (smart alternator), then the **Vehicle Ignition** connection will be required for your BCDC Alpha to function correctly. Identify the type of alternator your vehicle has by checking for a battery sensor on your vehicle's start battery as illustrated.



Battery Terminal with Sensor (Smart Alternator)

Regular Battery Terminal (Standard Alternator)

CABLE AND FUSE SIZING

⚠ CAUTION: Cable sizes are specified by various codes and standards which depend on the type of vehicle the auxiliary battery is installed in. Selecting the wrong cable size could result in harm to the installer or user and/ or damage the BCDC Alpha or other equipment installed in the system. The installer is responsible for ensuring that the correct cable sizes are used.

MAXIMUM EXPECTED CURRENTS

When selecting the **Ground**, **Auxiliary**, **Start Battery** and **Solar** cable sizes for your installation, consider the maximum expected currents for each connection. The table below highlights the maximum current each cable connection can be expected to carry.

Terminal	BCDC12025B	BCDC12050B
⏚ Ground	28 A	55 A
± Auxiliary Battery	25 A	50 A
Start Battery	28 A	55 A
Solar	28 A	55 A

GROUND CABLE

The **Ground** cable should be no longer than 1.5 m (4'11") in length and must be sized to conduct the full rated capacity of your BCDC Alpha. Refer to "Cable Size and Fuse Selection" (page 11).

AUXILIARY AND START BATTERY CABLE

The **Auxiliary** and **Start Battery** cables must meet the following requirements:

- The **Auxiliary Battery** cable must be no longer than 1.5 m (4'11") in length.
- Both cables must be sized to conduct the configured maximum current of the auxiliary and start battery terminals.*
- Both cables must be fused for protection. Refer to "Cable Size and Fuse Selection" (page 11) for fuse sizing and further information.

***NOTE:** The maximum current going into the auxiliary battery (**Max Charge Current**) and the maximum current drawn from the start battery (**Vehicle Input Current Limit**) can be configured via the Configurator App or Control Button (see "Set the Current Limits" (page 26)).

SOLAR CABLE

The **Solar** cable must be sized to conduct the short circuit current of your solar panel/s, regardless if it is below or greater than the BCDC Alpha's maximum solar input current (28 A or 55 A).

CABLE SIZE AND FUSE SELECTION

Select cable sizes based on the maximum expected currents from the **Ground**, **Auxiliary**, **Start Battery** and **Solar** connections. Appropriately sized fuses need to be selected for the Auxiliary and Start Battery connections to protect wiring.

REDARC strongly recommends using good quality PVC V90HT or XLPE insulated cables.

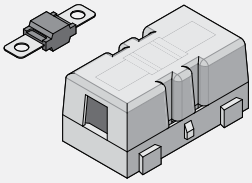
Expected Current	MIDI Fuse Rating (REDARC Fuse Kit) *Auxiliary and Start Battery only*		One-way Length		Cable Cross Sectional Area (mm^2)*2	Cable Gauge (AWG/B&S)*2
	In-cabin Install	Engine Bay Install*1				
10 A	15 A	15 A	0–2 m	0–6'7"	4	-
			2–5 m	6'7"–16'5"	6	-
			5–9 m	16'5"–29'6"	7.7	8
			9–12 m	29'6"–39'4"	13.5	6
25 A – 28 A	40 A (FK40)	50 A (FK50)	0–2 m	0–6'7"	6	-
			2–5 m	6'7"–16'5"	7.7	8
			5–12 m	16'5"–39'4"	13.5	6
40 A	50 A (FK50)	60 A (FK60)	0–5 m	0–16'5"	13.5	6
			5–12 m	16'5"–39'4"	20.2	4
50 A – 55 A	60 A (FK60)	70 A (FK70)	0–5 m	0–16'5"	20.2	4
			5–9 m	16'5"–29'6"	20.2	4
			9–12 m	29'6"–39'4"	26.6	3

***1** Fuses installed in an engine bay need to be rated slightly higher than those installed in-cabin. This is to compensate for higher engine bay temperatures.

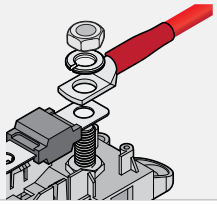
***2** Vehicles with smart alternators may have a reduced charging current if the minimum specified cable gauge is selected for long cable lengths. To avoid this, you can use the next cable size up.

Fuses must be mounted within 150 mm (6") of the battery positive (+) terminal — the REDARC **KIT19** battery-to-fuse cable is recommended for this connection.

MIDI Fuse with holder



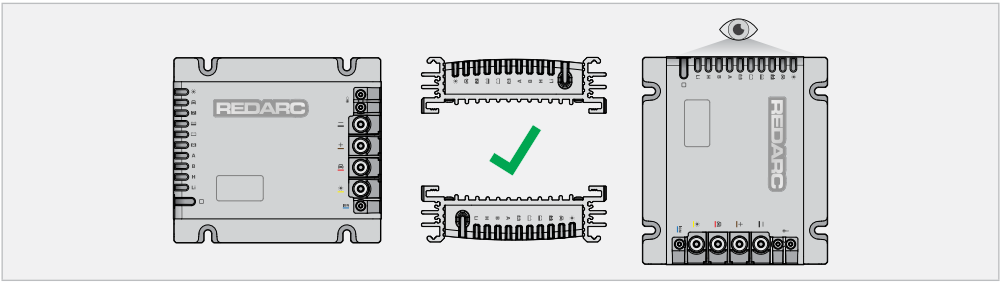
Fuse Assembly



INSTALLATION — MOUNTING

GENERAL MOUNTING REQUIREMENTS

- The Main Unit can be installed in the engine bay of a vehicle, along a chassis rail or in the cabin of a vehicle.
- Avoid using excessive cable lengths by first testing that all cables will comfortably reach each components correctly in your setup.
- All four Mounting Points must be used.
- Mount securely to a fixed surface that has adequate strength to support the Main Unit when all connections and wiring are in-place. DO NOT mount on moveable parts of the vehicle.
- The mounting surface must be flat and safe to drill — check the reverse side before drilling.
- The Main Unit can be mounted in an orientation where the Control Button and Status LEDs are visible and accessible. **Do not mount in an orientation that allows liquid to pool at the terminals, this could damage the Main Unit and other components in the system.**



MOUNTING RECOMMENDATIONS

MOUNTING CLEARANCES

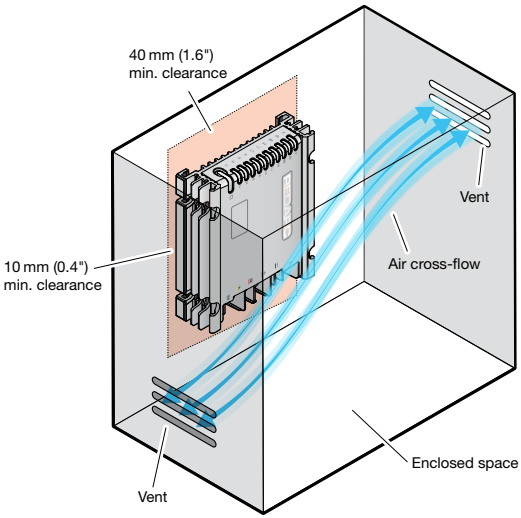
Leave clearance of at least 10 mm (0.4") on the sides and 40 mm (1.6") at each end of the Main Unit. Do not mount the Main Unit near surfaces or objects that become hot.

MOUNTING IN ENCLOSED SPACES

If installing in an enclosed space, make sure to leave adequate venting and clearance around all sides of the Main Unit.

Two vents should ideally be positioned at the top and bottom of the enclosure for cross-flow of air.

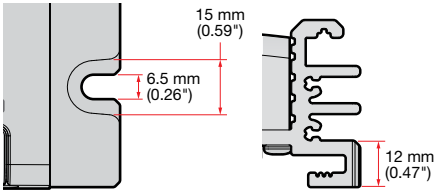
Failure to adequately ventilate can cause overheating, leading to degraded performance.

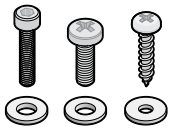


MOUNTING HARDWARE

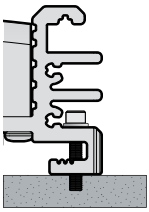
Use four M6 (1/4") fasteners with washers that are suitable for the mounting surface. The diameter of fastener heads and washers must not be larger than 14 mm (9/16").

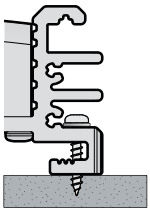
Do not use adhesives or adhesive tape to mount the Main Unit.

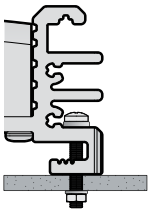




Recommended Fasteners
(not supplied)







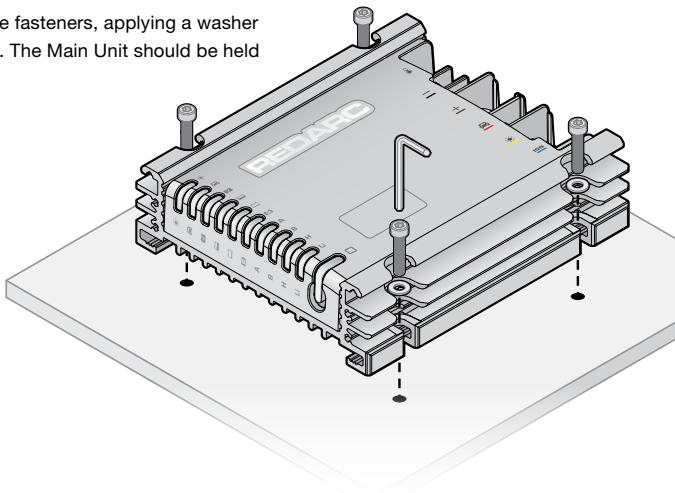
MOUNTING ACCESSORIES

REDARC has mounting brackets designed for specific vehicle models. They allow you to quickly mount the BCDC Alpha to existing mounting points in your vehicle. Visit the REDARC website to see the full range.

MOUNTING STEPS

⚠ **WARNING:** Use suitable Personal Protective Equipment (PPE) when operating power tools.

1. Place the Main Unit in its final position and carefully mark the centre of each mounting hole or use the provided mounting template. Refer to page 36 for mounting hole spacing dimensions.
2. Remove the Main Unit and drill clearance/pilot holes. De-burr the drilled holes and clear away swarf. Touch up any bare metal surfaces that have been exposed with a rust-inhibitor.
3. Fasten the Main Unit in place with suitable fasteners, applying a washer between the fastener and mounting point. The Main Unit should be held firmly against the mounting surface.



INSTALLATION — WIRING

⚠ WARNING: Before beginning wiring, carefully read and follow all advice listed in "Warnings & Safety Instructions" (page 4).

⚠ CAUTION: Wiring must be installed in protected areas away from heat sources and sharp objects. Cables must not be routed over or through moving parts of the vehicle. Additional protection such as conduit may be required, especially if routing cables through the engine bay and exposed areas.

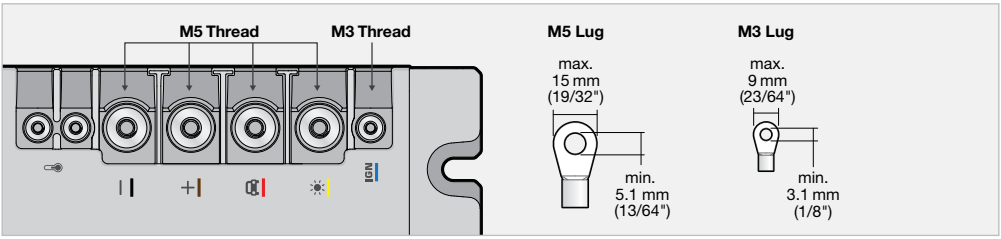
LUG REQUIREMENTS

CHOOSING LUGS

For the **Ground**, **Auxiliary**, **Start Battery** and **Solar** terminals, use M5 lugs or equivalent, with a barrel size to suit the required cable gauge.

If your vehicle requires a **Vehicle Ignition** connection, use an M3 lug (or equivalent) that has a cable barrel to suit the required cable gauge.

Ensure the lug tongues do not exceed the maximum widths shown below.

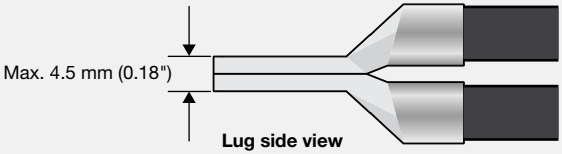


CONNECTING MULTIPLE LUGS

A maximum of two lugs can be connected to each Terminal on the Main Unit provided that:

- You only use the supplied M3 × 8 mm or M5 × 10 mm screws, or equivalent. Using longer screws may lead to poor electrical connection and may damage the Main Unit.
- The maximum combined lug thickness is no more than 4.5 mm (0.18") (applies to M5 and M3 Terminals).

If either of the above two conditions are not met, use a splice or busbar.



LUG AND HEATSHRINK ASSEMBLY

Assemble each cable with the appropriate sized lug using heatshrink as shown.

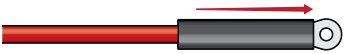
1. Slide the heatshrink over the cable.

2. Strip the end of the cable back enough to ensure the insulation does not enter the barrel of the lug when fully inserted.

3. Insert the stripped wires into the barrel of the lug.

4. Crimp the lug using the correct crimping tool.

5. Slide the heatshrink to partially cover the lug, leaving the lug tongue exposed.



6. Shrink the heatshrink.

CONNECT CABLES TO THE MAIN UNIT

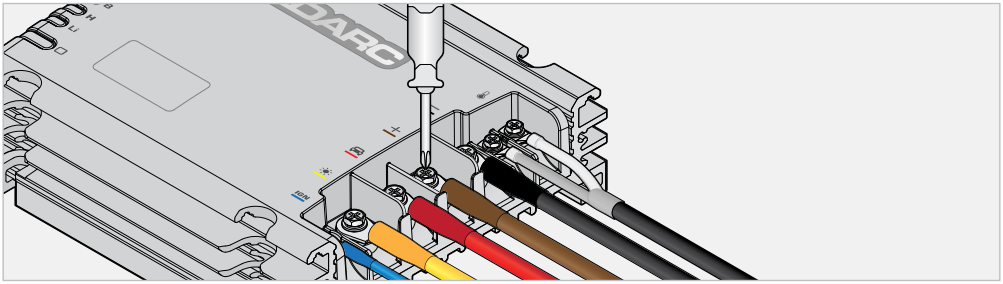
Connect the **Ground**, **Auxiliary Battery**, **Start Battery** and **Solar** cables to their corresponding terminals on the Main Unit using the supplied M5 Hex Head Phillips screws. Torque to 4 N·m (2.95 lbf·ft).

Connect the **Battery Temperature Sensor** and **Vehicle Ignition** (if required) cables to their corresponding terminals using the supplied M3 Hex Head Phillips Screws. Torque to 1 N·m (0.74 lbf·ft).

NOTE: The two Battery Temperature Sensor lugs can be connected to either of the corresponding terminals DO NOT secure both lugs to one terminal.

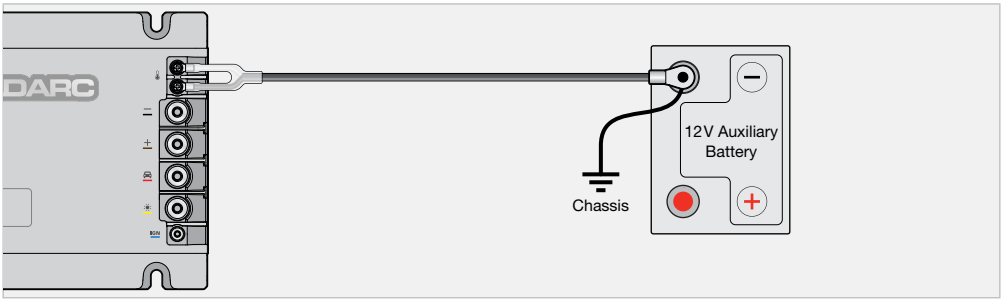
⚠ **WARNING:** Ensure accurate torquing of the terminal screws. Over-torquing can cause damage to the terminal threads. Under-torquing leads to loose screws which can create a high-resistance connection that could overheat, damaging the Main Unit and wiring, or could cause a fire.

NOTICE: Do not use a rattle gun or impact driver when fastening lugs, as these could damage the terminals.



BATTERY TEMPERATURE SENSOR CABLE CONNECTION

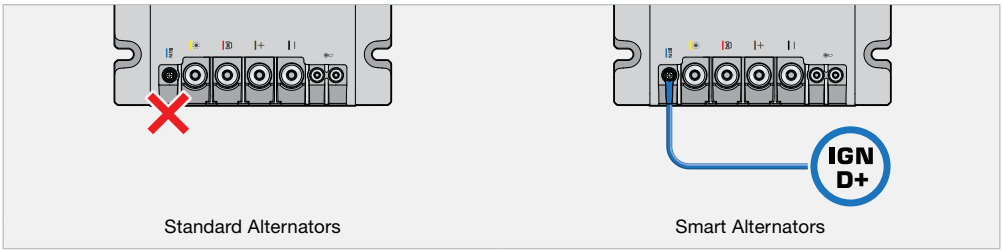
The **Battery Temperature Sensor** cable allows BCDC Alpha to monitor the temperature of the auxiliary battery during the charging process. BCDC Alpha will then adjust the charging rate automatically to protect against overheating for faster and safer charging. Connect the Temperature Sensor Cable to the negative (–) terminal on the auxiliary battery.



VEHICLE IGNITION CABLE CONNECTION

The **Vehicle Ignition** connection allows vehicles with variable-voltage alternators to trigger the BCDC Alpha to start or stop charging the auxiliary battery from the start battery. Refer to "Identifying Your Vehicle's Alternator Type", then connect the **Vehicle Ignition** cable depending on your alternator type:

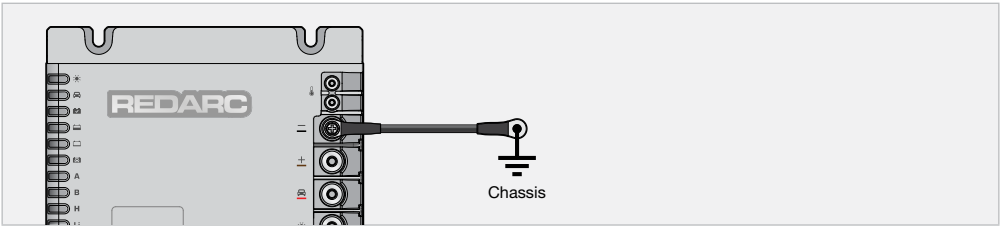
- **Fixed-voltage alternator** or **temperature compensating alternator (standard alternator)** — not required (leave disconnected).
- **Variable-voltage alternator (smart alternator)** — connect to a point that is live only when the ignition is turned on.
- **Idle-stop vehicles (smart alternator)** — connect to the alternator's D+ terminal or the output of one of the vehicle's fuses that is live only when the engine is running.



GROUND CABLE CONNECTION

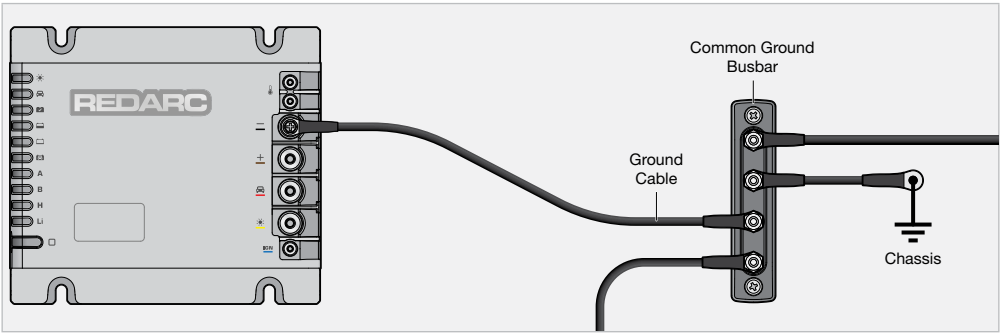
The **Ground** cable must be connected to a ground point that forms a common ground with all devices in your system. Do this by connecting all grounds to the vehicle chassis or by connecting all grounds to a common ground busbar, (see "Using a Common Ground Busbar" (page 17)).

No more than two lugs can be connected to the ground terminal on the Main Unit. Note that the connection must meet all requirements in the section "Connecting Multiple Lugs" (page 14). If it does not meet the requirements, use a splice or busbar, see "Using a Common Ground Busbar" (page 17).



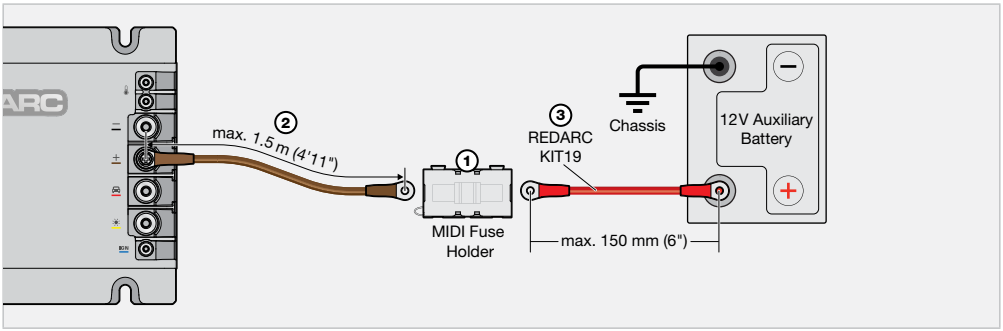
USING A COMMON GROUND BUSBAR

If you need to make multiple ground connections, use a separate common ground busbar. Ensure the ground cable between the Main Unit and the busbar is a sufficient gauge to suit the run-length.



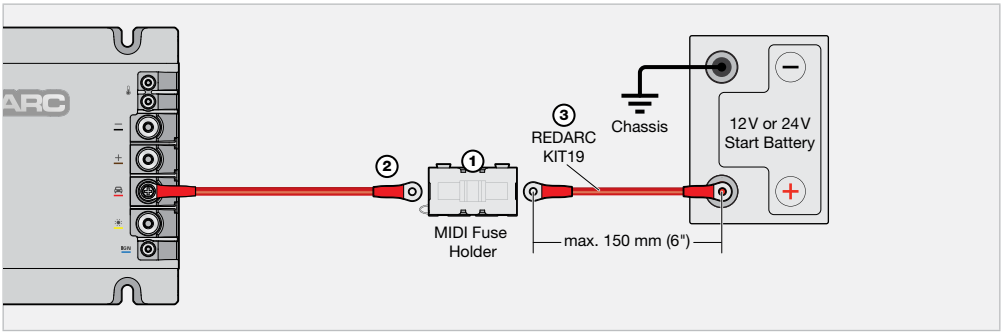
AUXILIARY BATTERY CABLE CONNECTION

1. Mount the MIDI fuse holder as close to the auxiliary battery as possible, make sure that the short cable to the auxiliary battery is able to reach between the fuse holder and the positive (+) terminal.
2. Take out the MIDI fuse from the fuse holder and connect the **Auxiliary Battery** cable between the Main Unit and the fuse holder. Ensure the cable length is no more than 1.5 m (4'11").
3. Connect a short cable between the fuse holder and the positive (+) terminal on the auxiliary battery. The short cable must be no longer than 150 mm (6"). **REDARC KIT19** is recommended for this connection.



START BATTERY CABLE CONNECTION

1. Mount the MIDI fuse holder as close to the start battery as possible, make sure that the short cable to the start battery is able to reach between the fuse holder and the start battery positive (+) terminal.
2. Take out the MIDI fuse from the fuse holder and connect the **Start Battery** cable between the Main Unit and the fuse holder.
3. Connect a short cable between the fuse holder and the positive (+) terminal on the start battery. The short cable must be no longer than 150 mm (6"). **REDARC KIT19** is recommended for this connection.



SOLAR CABLE CONNECTION

⚠ **CAUTION:** During the installation process, ensure that the panels are covered with an opaque material to prevent potentially dangerous voltages from inadvertently being generated.

NOTICE: DO NOT connect solar panels that have inbuilt regulators or use a supplementary external regulator. The BCDC Alpha has an inbuilt MPPT regulator that may not function correctly if regulated solar panels are connected.

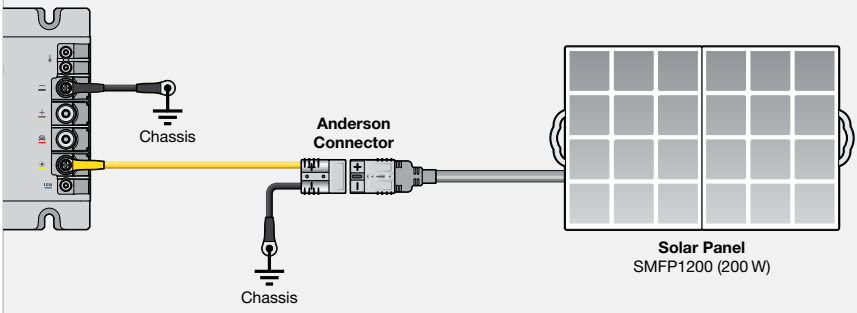
The BCDC Alpha prioritises charging from solar to lighten the load on your vehicle's alternator and maximise the collection of free solar energy. You can connect a single solar panel or create a solar array to collect maximum energy.

Refer to the installation examples in this section for different ways you can connect solar panels. It's important to meet to the different requirements for each type of setup.

- "Connecting a Single Solar Panel" (page 19)
- "Connecting 1 to 2 solar panels in parallel" (page 20)
- "Connecting more than 2 solar panels in parallel" (page 21)

CONNECTING A SINGLE SOLAR PANEL

Basic Single Panel Example



CONNECTING MULTIPLE PANELS

The BCDC Alpha can draw power from multiple solar panels in large solar arrays, which can be configured in parallel connections. For correct operation and best performance of the system, choose the solar panel specification and configuration to ensure that:

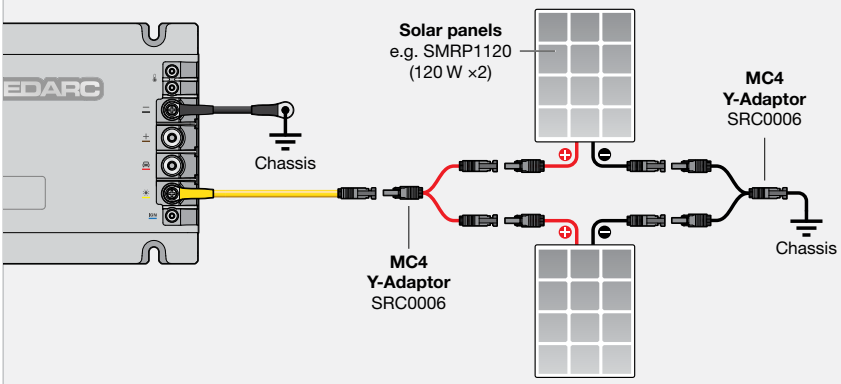
- The open circuit voltage of the array is below the 48 V maximum solar input voltage range of the BCDC Alpha at minimum ambient temperature.
- The total rated power is below the maximum array size (page 37) rating of the BCDC Alpha.
- All solar panels are the same.
- All solar panels are pointing in the same direction.

Connecting 1 to 2 solar panels in parallel

When connecting 1 or 2 solar panels in parallel, it is important the solar connection meets the following requirements:

- The solar panel ground is connected to a common ground point (i.e. vehicle chassis).
- The Solar cable gauge is capable of carrying the combined short circuit capacity of the panel(s).

2 Solar Panels in Parallel Example

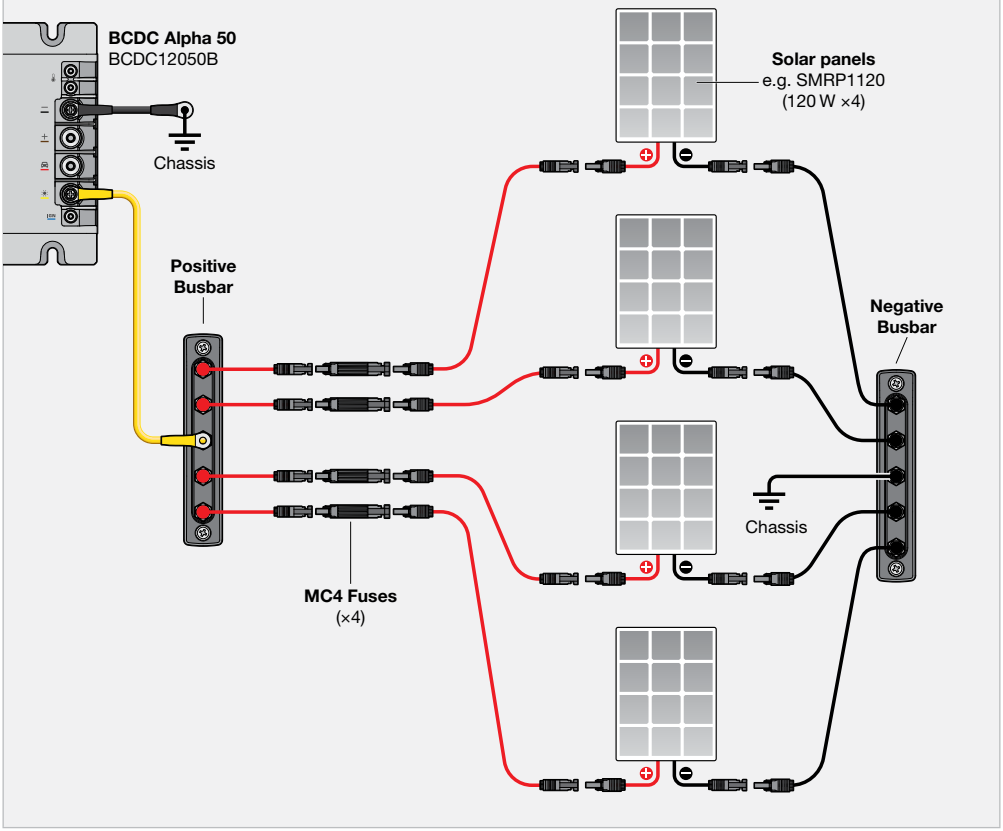


Connecting more than 2 solar panels in parallel

When connecting more than 2 solar panels in parallel, it is important the solar connection meets requirements on page 20 and the following:

- The solar panel ground is connected to a common ground point (i.e. common ground busbar connected to vehicle chassis).
- Solar combiners, a positive busbar or fuse box is used to connect all panels in an array.
- Fuses are installed to protect against overcurrent faults and are appropriately sized for the panel's maximum short circuit current capacity. Each fuse rating must be no more than 1.5× the short circuit current capacity of the panel it is protecting.
- The solar cable gauge to the Main Unit is capable of carrying the combined short circuit capacity of the solar panel array, regardless of the maximum solar current rating of the Main Unit.
- Busbars and fuse holders must be suitable for the environmental conditions of their mounting locations.

4 Solar Panels in Parallel Example (BCDC12050B only)

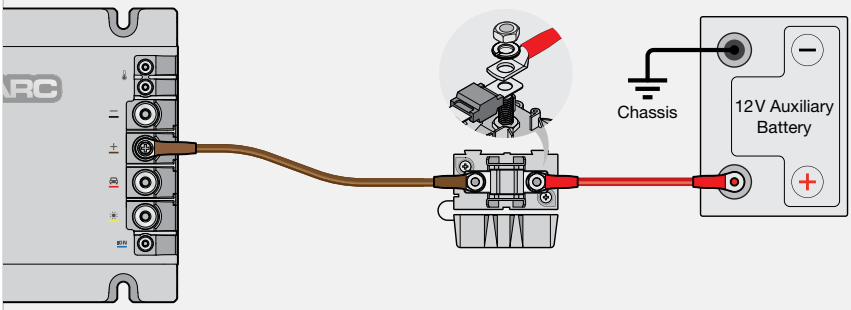


FUSE CONNECTIONS

To complete the **Auxiliary Battery** cable connection, install and secure the auxiliary battery MIDI fuse to the fuse holder as illustrated below.

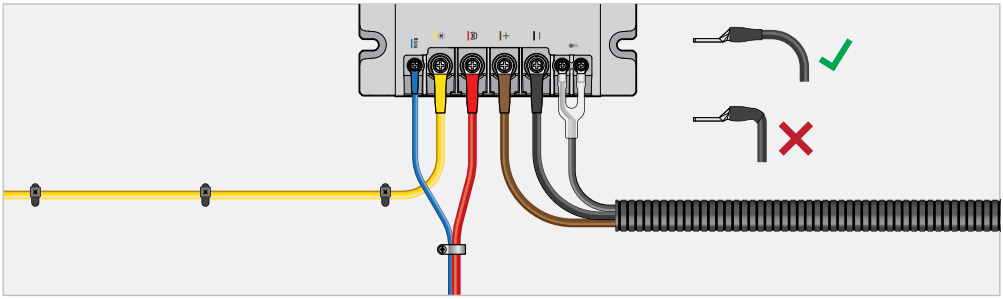
Then, install and secure the start battery MIDI fuse to the fuse holder to complete the **Start Battery** cable connection.

Auxiliary Battery Fuse Example



STRAIN-RELIEF AND CABLE MANAGEMENT

- Allow for strain-relief for cables, ensuring cables are not pulled or stretched tightly.
- Secure the cables to a fixed point close to the Main Unit — using cable ties, cable clips or P-clips are recommended.
- Flexible conduit can be used to manage and protect cables running in the same direction; see example below.
- When installing in harsh environments, apply battery terminal protector or dielectric grease (such as lanolin) to the terminals on the Main Unit to protect against corrosion.



SYSTEM CONFIGURATION

Once installed, configure the system to define the BCDC Alpha's behaviours and operation, and your auxiliary battery's specifications. Essential settings can be configured via the Control Button, while additional settings are available via the Configurator App.

When power is first applied to the BCDC Alpha, the Control Button will flash white, then all LEDs will illuminate red for approximately 5 seconds to indicate that the BCDC Alpha is On and ready to be configured.

DEFAULT SETTINGS

	BCDC12025B	BCDC12050B
Vehicle Input Trigger	Auto	Auto
Vehicle Input Current Limit	28 A	55 A
Start Battery Charge Mode	Disabled	Disabled
Battery Type[*1]	Gel	Gel
Battery Size[*1]	100 Ah	100 Ah
Max Charge Current	25 A	50 A
Low Voltage Alarm	9 V	9 V

***1** Refer to the manufacturer's specifications for your auxiliary battery to find this value.

CONFIGURE VIA THE APP

Get the RedVision® Configurator App

Download the free REDARC RedVision® Configurator App to Configure the settings of the BCDC Alpha using your smartphone via Bluetooth®.

PAIRING INSTRUCTIONS

1. Download the Configurator App and make sure Bluetooth® is enabled on your smartphone. Note, some smartphones also require locations services to be enabled.
2. Press and hold the Control Button until it turns **blue**.
3. Open the Configurator App and allow the required permissions.
4. In the **"Choose Configuration"** screen, tap the **"Read Device"** then select the system that matches the Product Serial Number on the Main Unit.
5. When the **"Pair"** banner appears, tap Pair.
6. Under the "**Charger Settings**" heading tap **"Charger Unit"** to navigate to the "**Configure BCDC Alpha**" screen.
7. You are now ready to configure your BCDC Alpha — proceed to "Configure the BCDC Settings" (page 24).

CONFIGURE THE BCDC SETTINGS

8. In the **"BCDC Settings"**, configure the settings listed below. Note, some settings can also be configured via the Control Button on the Main Unit.
   - **Vehicle Input Trigger** (page 25)
   - **Vehicle Input Current Limit** (page 25) — also configurable via the Control Button (page 26)
   - **Start Battery Charge Mode** (page 27)
9. Once all settings have been configured, tap **Save**  .

CONFIGURE THE BATTERY SETTINGS

10. In the **"Battery Settings"**, refer to the manufacturer's specifications of your auxiliary battery for these values.
    - **Battery Type** — also configurable via the Control Button (page 28)
    - **Battery Size** (page 28)
    - **Max Charge Current** — also configurable via the Control Button (page 26)

CONFIGURE THE ALARM SETTINGS

11. In the **"Alarm Settings"**, configure the **Low Voltage Alarm** (page 28).
12. Once all settings have been configured, tap **Save**  .

COMPLETE CONFIGURATION

13. Tap **Program**  .
14. In the **"Choose Configuration"** screen, re-select your system. Do not exit the App until the success message appears on your smartphone. The system is now configured, and Bluetooth pairing is complete.

SET THE VEHICLE INPUT TRIGGER

The **Vehicle Input Trigger** sets the vehicle start battery input turn on/off voltage.

Configuration: App only
Default: Auto
Settings:

- **Auto** — automatically detects if the start battery is 12 V or 24 V and operates within the 12/24 V parameters explained below. **Auto** is suitable for most vehicle alternators.
- **12 V** — for a 12 V vehicle system and prevents the Main Unit from going into 24 V mode.
- **24 V** — for a 24 V vehicle system and prevents the Main Unit from going into 12 V mode.
- **Ignition** — for non-standard systems between 9 V and 32 V. The BCDC Alpha will only charge from the start battery input when the engine is running.
- **On** — for systems with a dual battery isolator, or for non-standard systems between 9 V and 32 V.

Vehicle Input Trigger Setting*2		Vehicle Ignition Cable Connected	Recommended for Alternator Type	Start Charging When ABOVE	Stop Charging When BELOW
Auto	12 V	No	Standard	12.9 V	12.7 V
		Yes	Smart*1	12.0 V	11.9 V
	24 V	No	Standard	25.8 V	25.4 V
		Yes	Smart*1	24.0 V	23.8 V
Ignition		Yes	Non-standard systems	9.1 V	9.0 V
On		Ignored	Non-standard systems	9.1 V	9.0 V

*1 If your vehicle has a smart alternator, the Vehicle Ignition cable connection is required for the start battery to provide charge effectively — see "Vehicle Ignition Cable Connection" (page 16). To identify your alternator type, see "Identifying Your Vehicle's Alternator Type" (page 9).

*2 **Start Battery Charge Mode** and **Start Battery Recovery** are only available for 12 V vehicle batteries and require the **Vehicle Input Trigger** to be set to '**Auto**' or '**12 V**' mode.

SET THE CURRENT LIMITS

VEHICLE INPUT CURRENT LIMIT

The **Vehicle Input Current Limit** sets the maximum current drawn from the vehicle's start battery to be at or below the maximum capacity of your BCDC Alpha (28 A or 55 A). Ensure the **Start Battery** cable size and fuse size installed is capable of carrying this configuration.

Configure via:	App or Control Button
Default setting:	100% of the maximum input current of your BCDC Alpha, (28 A or 55 A)
Settings:	BCDC12025B — 5 A to 28 A in increments of 1 A
	BCDC12050B — 5 A to 55 A in increments of 1 A

MAX CHARGE CURRENT

The **Max Charge Current** sets the maximum current supplied from the BCDC Alpha to be at or below the maximum output of your BCDC Alpha (25 A or 50 A). Ensure the **Auxiliary Battery** cable size and fuse size installed is capable of carrying this configuration.

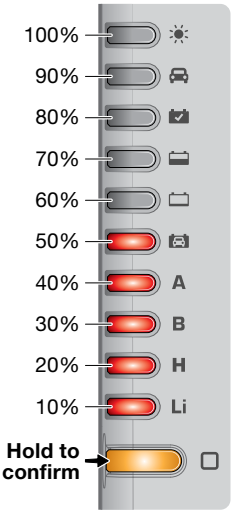
Configure via:	App or Control Button
Default setting:	100% of the maximum input current of your BCDC Alpha, (25 A or 50 A)
Settings:	BCDC12025B — 4 A to 25 A in increments of 1 A
	BCDC12050B — 4 A to 50 A in increments of 1 A

SET VIA THE CONTROL BUTTON

Using the Control Button sets both Charge Currents (**Vehicle Input Current Limit** and **Max Charge Current**) simultaneously — to set different values, use the Configurator App.

1. Press and hold the Control Button until it turns **blue**, then press the Control Button to cycle through settings until it is **flashing orange**.
2. Press and hold the Control Button until the LED is **solid orange** to enter the Maximum Charge Current setting.
3. Press the Control Button to cycle through settings in increments of 10%. The setting is indicated by the Charge Status LEDs.
4. To confirm the chosen setting, press and hold the Control Button until it **rapidly flashes orange**. After 10 seconds of no-input, the Control Button LED will automatically turn off.

NOTE: The minimum percentage limit on the BCDC12025B is 20%.



Overriding the Configurator App

If the Charging Currents have already been configured separately using the Configurator App every second LED on the Main Unit will illuminate solid red when you first enter this setting. To override, press the Control Button to begin cycling through the settings, then to confirm the new configuration press and hold the Control Button until it rapidly flashes orange.

SET THE START BATTERY CHARGE MODE

Start Battery Charge Mode will keep the vehicle's start battery topped up from the solar input once the auxiliary battery is fully charged (and in the Float stage — see "Charging Stages" (page 32)).

Configure via: App only
Default setting: Disabled
Settings: Enabled, Disabled

When in this Mode, the BCDC Alpha delivers up to 25 A to the start battery (unless the Vehicle Input Current Limit or Max Charge Current is configured lower) and aims to keep the start battery topped up to 12.8 V.

NOTE: Start Battery Charge Mode is only available for 12 V vehicle batteries and requires the Vehicle Input Trigger setting in the Configurator App to be set to '**Auto**' or '**12 V**'.

MONITORING START BATTERY CHARGE MODE

Once the auxiliary battery is fully charged (in Float mode), the BCDC Alpha will alternate between charging the start battery from the auxiliary battery and refreshing the charge of the auxiliary battery from solar. During this process the auxiliary battery will remain nearly fully charged.

When **Start Battery Charge Mode** the **Chargeback LED** on the Main Unit will illuminate **solid red**.

SET THE BATTERY TYPE

The Battery Type setting must match the chemistry of your auxiliary battery (refer to the manufacturer's specifications). It makes sure that the correct charging profile is used for your battery's chemistry type.

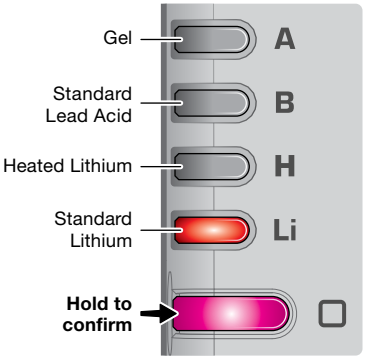
Configure via: App or Control Button

Settings:

LED	Control Button Setting	App Setting	
A	Gel (default)	AGM	Gel (default)
B	Standard Lead Acid	Standard Lead Acid	Calcium
H	Heated Lithium	Heated Lithium	
Li	Standard Lithium	Standard Lithium	

SET VIA THE CONTROL BUTTON

1. Press and hold the Control Button until it turns **blue**, then press the Control Button to cycle through settings until it is **flashing pink**.
2. Press and hold the Control Button until the LED is **solid pink** to enter the **Profile Select** setting.
3. Press the Control Button to cycle through the Charging Profiles, indicated on the Charge Profile LEDs.
4. To confirm the chosen setting, press and hold the Control Button until it rapidly flashes pink. After 10 seconds of no input, the Control Button LED will automatically turn off.



SET THE BATTERY SIZE

The Battery Size setting must match the capacity of your auxiliary battery in amp-hours (Ah). Refer to the manufacturer's specifications for your auxiliary battery to find this value.

Configure via: App only
Default setting: 100 Ah
Settings: 40 Ah to 1250 Ah in increments of 5 Ah

SET THE LOW VOLTAGE ALARM

The Low Voltage Alarm alerts you when the auxiliary battery voltage drops below the configured voltage. In the event a low voltage event, the **Float** Status LED on the Main Unit will flash red and an alert will be displayed in the RedVision® App — see "Faults" (page 33).

Configure via: App only
Default setting: 9 V
Settings: 8.0 V to 15.0 V in increments of 0.1 V

EDIT A CONFIGURATION

1. Open the RedVision® Configurator App. From the list, choose the configuration you want to edit.
2. Edit the configuration to suit your setup — remember to tap **Save** each time you make a change.
3. Once all changes have been made, press **Program**.

END-USER LOCKOUT

The BCDC Alpha allows you to add an Installer PIN to prevent end-users from changing the configuration of their RedVision system. This is to avoid safety hazards if the system is reconfigured in an unsafe way by persons who do not fully understand the important system requirements.

IMPORTANT: By adding an Installer PIN, the saved configuration cannot be edited without entering the correct PIN. DO NOT forget the PIN.

ADD AN INSTALLER PIN

1. Open the Configurator App. From the **Choose Configuration** screen, select the configuration you want to add an installer PIN to.
2. Tap the **Setting Icon** at the top right of the screen, then select **Add Installer PIN** from the pop-up list.
3. Type a 4 to 8 digit PIN into the **New PIN** field, then retype it in the **Confirm new PIN** field. Tap **Add**. The PIN will now have to be input in order to make any changes to the locked configuration.
4. To save the Installer PIN into the system, press **Program**.

REMOVE THE INSTALLER PIN

1. Open the Configurator App. From the **Config System** screen, select the configuration you want to remove the Installer PIN from.
2. Tap the **Settings Icon** at the top right of the screen, then select **Remove Installer PIN** from the pop-up list.
3. Type the PIN into the **Current PIN** field, then tap **Remove**.

OPERATION

PAIR TO THE REDVISION® APP

Get the RedVision® App

The RedVision® App gives you remote access to the BCDC Alpha's functions and features including system and input source monitoring.

PAIRING INSTRUCTIONS

1. Download the RedVision® App and make sure Bluetooth® is enabled on your smartphone. Note, some smartphones also require locations services to be enabled.
2. Press and hold the Control Button until it turns **blue**.
3. Open the RedVision® App and allow the required permissions if it's the first time using the App.
4. Tap **Menu** ☰, then under the devices heading, tap **Add (+)**.
5. Tap the device that matches the product serial number on your BCDC Alpha. Read and agree to the disclaimer.
6. When the Bluetooth pairing request appears, tap **Pair**.
7. Once the Control Button turns **solid blue** and system information appears on your smartphone, Bluetooth® pairing is complete. Note, first time pairing may take a few minutes.

SUBSEQUENT CONNECTIONS

Once a smartphone has been paired with the BCDC Alpha, it will automatically reconnect when the RedVision® App is opened and the BCDC Alpha is selected — Tap **Menu** ☰, then select the BCDC Alpha from the **Devices** list.

PAIRING MULTIPLE SMARTPHONES

The BCDC Alpha can be paired to multiple smartphones, however it can only be monitored/controlled by the one smartphone at a time. When the RedVision® App is minimised on one smartphone, the RedVision® App can be opened on another smartphone and will connect automatically if it has previously been paired.

To pair another smartphone, repeat the steps in "Pair to the RedVision® App" (page 30).

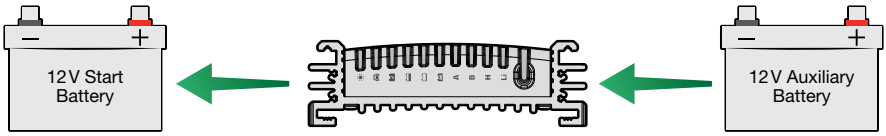
START BATTERY RECOVERY

Start Battery Recovery charges a flat start battery from the auxiliary battery for approximately 15 minutes, enough charge to safely start the vehicle in the event of a flat battery. It provides a better outcome than a standard jump-start, and will work down to an auxiliary battery voltage of 11.5 V.

The start battery input on the BCDC Alpha is disabled for 5 minutes after a full Recovery cycle to allow the alternator to restore the start battery to a healthy state of charge.

When in this Mode, the BCDC Alpha delivers 25 A / 50 A to the start battery (unless the Vehicle Input Current Limit or Max Charge Current is configured lower) and aims to charge the start battery up to 14.6 V.

NOTE: Start Battery Recovery is only available for 12 V vehicle batteries and requires the Vehicle Input Trigger setting to be set to '**Auto**' or '**12V**' in the Configurator App — see "Set the Vehicle Input Trigger" (page 25).



If vehicle's start battery is very flat, the Recovery may need to be repeated.

START BATTERY RECOVERY VIA THE REDVISION® APP

1. Open the RedVision® App and make sure your smartphone is connected to the BCDC Alpha.
2. Tap **Menu** ☰, then tap **Recovery**.
3. When the **"Initiate Recovery Mode"** banner appears, tap **Accept**, then under **"Battery Recovery Ready"** heading on the home screen, tap **Go** to begin the Recovery process.
4. In the App, the screen will display the Recovery progress, and the **Chargeback LED** will illuminate **solid red**.
5. The App will indicate when the Recovery is complete.

START BATTERY RECOVERY VIA THE CONTROL BUTTON

1. Press and hold the Control Button until it turns **blue**, then press the Control Button to cycle through the settings until it is **flashing green**.
2. To begin Recovery, press and hold the Control Button until the LED turns **solid green**.
   The **Chargeback LED** will illuminate solid red while the start battery is charging (approximately 15 minutes).

   NOTE: If you need to cancel the Recovery process, press and hold the Control Button until the Control Button LED turns off.
3. Once the **Chargeback LED** turns off, Recovery is complete.

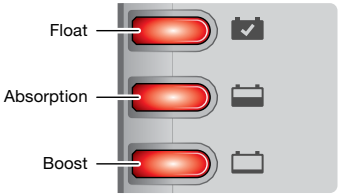
If the **Chargeback LED** starts flashing red and the Control Button LED illuminates solid red, the Start Battery Recovery has failed — see "Faults" (page 33) for troubleshooting.

CHARGING STAGES

The auxiliary battery's charging stage is indicated by the Charging Stage LEDs on the Main Unit.

BOOST

When the Main Unit is on and charging, it will begin in the Boost stage. This stage gradually ramps up then maintains a constant current until the auxiliary battery's voltage reaches its Absorption voltage. In the Boost stage, the current may vary to maintain a safe operating temperature, or to limit the difference between the input and output voltages.

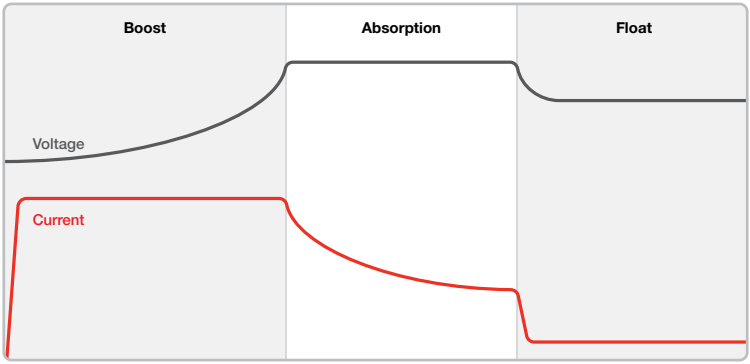


ABSORPTION

This stage maintains a constant voltage level for a predetermined period of time or until the current being drawn by the auxiliary battery drops to less than 4 A (or 4% of the configured auxiliary battery capacity in Ah, whichever is greater) for 30 seconds. Once this occurs the Main Unit moves into the Float stage.

FLOAT

In the Float stage, the Main Unit maintains 13.3 V (13.6 V for Lithium profiles) on the auxiliary battery to keep the battery topped up. This counteracts the battery's self-discharge or loads applied to the battery. When the battery loses charge, the Main Unit will move back into the Boost stage.



The BCDC Alpha has automatic timeouts to protect the auxiliary battery from being damaged by overcharging. The Main Unit will automatically move from Boost to Absorption or Float according to these timeouts. If a timeout occurs before the battery is fully charged, the charge process will begin again from the Boost stage after a 'rest period'. Timeouts for Li profile batteries have been adapted to suit optimal charging for large lithium battery banks.

CARE AND MAINTENANCE

⚠ CAUTION: Before performing work or maintenance on the auxiliary electrical system (which includes the Vehicle Start Battery, Auxiliary Battery, and Solar Panels), isolate all input and output sources of power to the electrical system and charger. Isolate the system by removing fuses or by activating isolation switches (if fitted).

There is a risk electric shock and fire if all sources of power are not completely isolated before carrying out work.

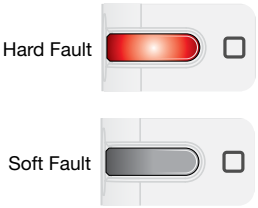
- Periodically check that all connections are firm, and that all cables are adequately managed. Parts of the system may have moved as a result of repeated vibration, particularly if the vehicle has been travelling on uneven/ corrugated road surfaces.
- Look for signs of damage or wear along the cables especially parts of the cable around connections through glands, or against hot surfaces — replace if damaged.

TROUBLESHOOTING

FAULTS

All Faults are communicated by the Status LEDs on the Main Unit and in the RedVision® App. There are two levels of Faults indicated by the Status LEDs:

- **Hard Fault —** The system will stop charging. The LED corresponding to the fault will flash red and the Control Button LED will illuminate solid red.
- **Soft Fault —** System will continue charging. The LED corresponding to the fault will flash red and the Control Button LED will remain off.



Solar Overvoltage Fault — A soft fault indicating the solar terminal is slightly overvoltaged, this will become a hard fault as the voltage increases, see page 37 for operating range specifications.

Alternator Overvoltage Fault — A soft fault indicating the Start Battery terminal is slightly overvoltaged, this will become a hard fault as the voltage increases, see page 37 for operating range specifications.

Low Voltage Alarm — Soft fault indicating your auxiliary battery is below the Low Voltage Alarm configured via the App, see page 28.

Auxiliary Battery Overvoltage — A hard fault indicating your auxiliary battery is significantly above the expected voltage.

Charger Overvoltage — A hard fault indicating the Auxiliary Battery terminal voltage is outside the voltage range.

Charger Overcurrent — A hard fault indicating excessive current on the output. Power cycle the BCDC Alpha by disconnecting all powered terminals, if the fault persists, contact technical support.

Auxiliary Battery Over Temperature — A hard fault indicating your auxiliary battery is above the charging temperature range. Clears when the auxiliary battery's temperature returns within the specified charging range, see page 37.

Auxiliary Battery Under Temperature — A hard fault indicating your auxiliary battery is under the charging temperature range. Clears when the auxiliary battery's temperature returns within the specified charging range, see page 37.

Recovery No Battery Detected — A soft fault indicating either auxiliary or start battery was not detected when initiating Start Battery Recovery Mode. This fault will remain active for 3 minutes during which time the Main Unit will not charge from the start battery input — check auxiliary battery charge and system wiring.

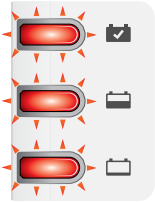
Start Battery Recovery Fault — A soft fault indicating that Start Battery Recovery Mode has failed. This fault will remain active for 3 minutes and the Main Unit will not charge from the start battery input — check auxiliary battery charge and system wiring

Charger Over Temperature — A hard fault indicating the Main Unit is above the operating temperature range, see page 37. Disconnect wiring from the Main Unit and wait for it to cool down before using.

Internal Hardware Fault — A hard fault indicating an internal hardware fault. Power cycle the BCDC Alpha by disconnecting all powered terminals, if the fault persists, contact technical support.

Reverse Polarity Detected — A hard fault indicating incorrect system wiring. Check system wiring, if the fault persists, contact technical support.

System Fault — Contact technical support.



No Battery Temperature Sensor Cable — A soft fault indicating the battery temperature sensor cable has broken or become disconnected from the Main Unit. This fault is indicated by one of the Charging Stage LED corresponding to the current charging stage.

Communications Fault — A soft fault relating to Bluetooth pairing, see page 35 for troubleshooting.

COMMUNICATION TROUBLESHOOTING

When the Control Button LED is solid red the RedVision® or Configurator Apps are unable to communicate with the BCDC Alpha.

To resolve, try the following:

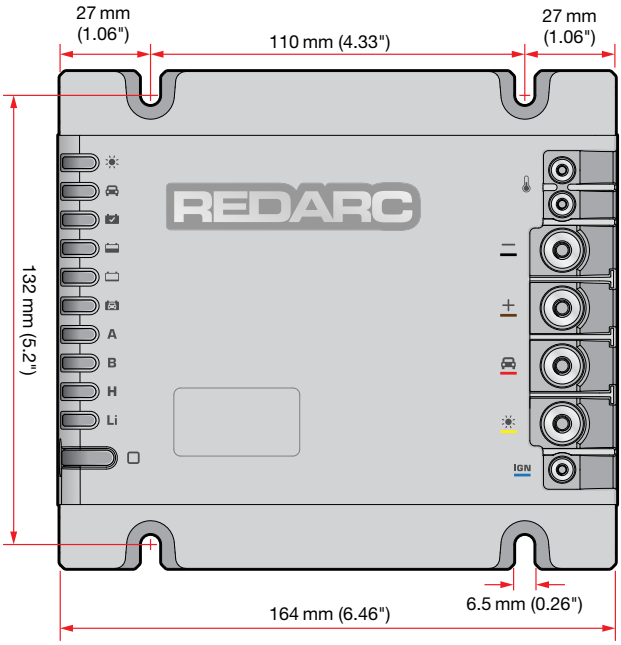
1. In the RedVision® App, tap **Menu** ☰ then delete your BCDC Alpha from **Devices** list.
2. In your smartphone's Bluetooth settings, remove your BCDC Alpha from your Bluetooth devices list.
3. Switch off and then re-start your smartphone.
4. Clear all Main Unit pairings. Press and hold the Control Button until the Control Button LED it turns **blue**. Next, press and hold the Control Button. The Status LEDs will illuminate in sequence. Once all LEDs are illuminated, the Control Button will flash blue rapidly for 1 second to indicate that all device pairings have been cleared.
5. Re-pair your smartphone and Main Unit by following the bluetooth pairing instructions on page 30.

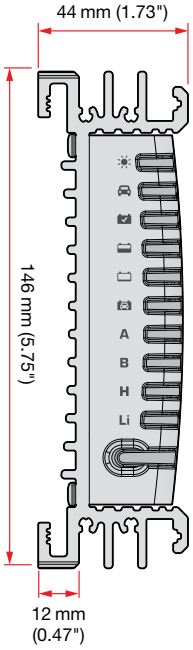
   If the fault remains, it is likely an Internal Hardware Fault. Contact REDARC Tech Support.

SPECIFICATIONS

GENERAL SPECIFICATIONS

	BCDC12025B	BCDC12050B
Weight	925 g (32.6 oz)	960 g (33.9 oz)
Dimensions	164 × 146 × 44 mm (6.46" × 5.75" × 1.73")	
M5 Terminal Depth	9 mm (0.35")	
M5 Terminal Torque	4 N·m (2.95 lbf·ft)	
M3 Terminal Depth	8 mm (0.31")	
M3 Terminal Torque	1 N·m (0.74 lbf·ft)	





ELECTRICAL SPECIFICATIONS

	BCDC12025B	BCDC12050B
Nominal Current Rating	25 A	50 A
Operating Temperature*1	–40°C to 85°C (–40°F to 185°F)	
Start Battery Input		
Voltage Range	9 to 32 V DC ⎓	
Maximum Input Current	28 A	55 A
Solar Input		
Voltage Range*2	9 to 48 V DC ⎓	
Maximum Input Current	28 A	55 A
Maximum Array Size	500 W	1000 W
Output		
Nominal Output Voltage	12 V	
Voltage Range	9 to 16 V DC ⎓	
Maximum Output Current	25 A	50 A
Recommended Battery Capacity	40 to 300 Ah	50 to 600 Ah
Maximum Output Power	400 W	800 W

MAXIMUM VOLTS @ BATTERY TERMINALS (25°C / 77°F)

Battery Type	Boost/Absorption	Float
AGM / Gel	14.5 V	13.3 V
Calcium	15.2 V	13.3 V
Standard Lead Acid	14.9 V	13.3 V
Heated and Standard Lithium	14.2 V	13.6 V

THERMAL SPECIFICATIONS

Battery Type	Charging Temperature Range
Calcium / SLA	–25°C to 90°C (–13°F to 194°F)
AGM	–25°C to 60°C (–13°F to 140°F)
Gel	0°C to 60°C (32°F to 140°F)
Standard $LiFePO_4$	0°C to 60°C (32°F to 140°F)
Heated $LiFePO_4$*3	–25°C to 60°C (–13°F to 140°F)

***1** As the temperature of the unit rises above a certain level the current capacity of the output is decreased gradually in order protect both the battery and the unit.

***2** The maximum voltage of the solar array should be calculated for the minimum temperature that it would be exposed to. The value should be less than 48 V or else damage to the unit may occur. The unit will not charge if the voltage is too high.

***3** The Heated Lithium (H) charging profile should only be used with lithium batteries that feature a functioning heating element. If unsure, the Standard Lithium (Li) charging profile must be used. Using the wrong charging profile may damage your lithium battery.

TEMPERATURE COMPENSATION

Battery Type Setting	Voltage / Temperature Range
AGM / Calcium / Gel / SLA	0°C < –30 mV / °C < 60°C (32°F < –17 mV / °F < 140°F)
$LiFePO_4$	40°C < –70 mV / °C < 60°C (104°F < –39 mV / °F < 140°F)

COMPLIANCE AND STANDARDS

Compliance Marks	
IP Rating	IP67/IP69K
FCC ID	2BAH6-BCDCX01
IC ID	30290-BCDCX01
	CAN ICES-003 (B)/ NMB-003(B)

Internal Transmission Notice

1. **WARNING: Any changes or modifications not expressively approved by the grantee could void the user's authority to operate this equipment.**

2. **FCC Statement — Class B**

   Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

   - Reorient or relocate the receiving antenna.
   - Increase the separation between the equipment and receiver.
   - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
   - Consult the dealer or an experienced radio/TV technician for help

3. This device complies with Part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada's licence-exempt RSS (s). Operation is subject to the following two conditions:

   (1) This device may not cause interference.

   (2) This device must accept any interference, including interference that may cause undesired operation of the device.

   L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

   (1) L'appareil ne doit pas produire de brouillage.

   (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillardest susceptible d'en compromettre le fonctionnement

4. This equipment complies with the FCC and ISED Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and all persons during normal operation.

   Cet équipement est conforme aux limites d'exposition aux rayonnements de la FCC et ISED Canada établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et toutes les personnes pendant le fonctionnement normal.

WARRANTY

For full warranty terms and conditions, visit the Warranty page of the REDARC website:
www.redarcelectronics.com/warranty

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CHECKING THE PRODUCT SERIAL NUMBER

The Product Serial Number is located on the product and on the product packaging.

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