

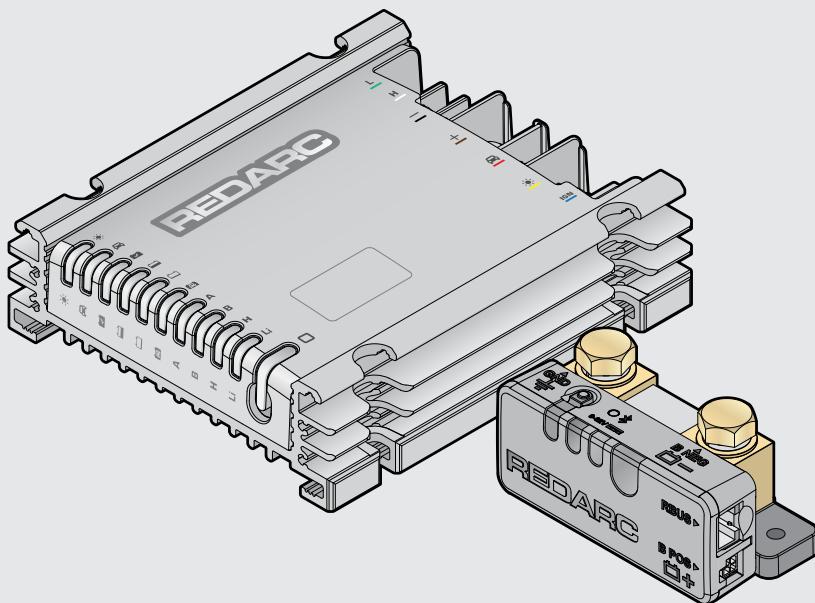
THE POWER OF

**REDARC**

# **BCDC ALPHA® 50R**

**BCDC12050R**

12V 50A DC-DC Charger with  
Smart Battery Monitoring



## BCDC ALPHA® 50R

The BCDC Alpha 50R charges all common 12V automotive battery types including standard and heated lithium. It is equipped with screw terminals for easy installation, and has a push-button interface for simple operation.

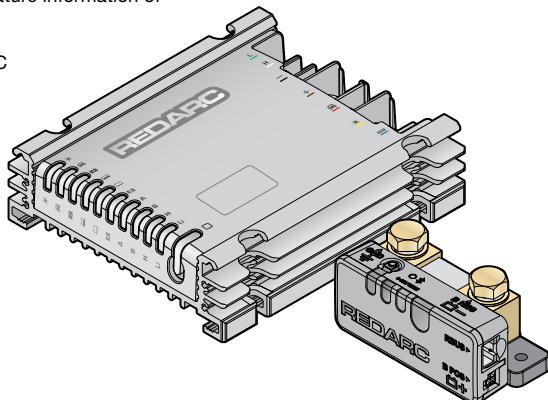
The BCDC Alpha 50R prioritises charging from solar before supplementing from the vehicle start battery to lighten the load on your alternator and maximise the collection of free solar energy, with an option for excess solar energy to then top-up the vehicle start battery.

The Battery Monitor provides critical system information including battery voltage, current, State of Charge (SoC) and temperature information of the connected battery via the RedVision® App.

The Battery Monitor can be combined with REDARC R-Bus compatible products, including the TVMS Rogue with the RedVision® Display.

Note, the RedVision® Display requires a TVMS Rogue or TVMS Prime to operate and cannot be powered directly by the BCDC Alpha 50R.

The BCDC Alpha 50R also features the capability to seamlessly revive and charge a fully flattened lithium battery.



**Get the Free  
Configurator App**

**Configure** the settings of your System 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 50R have not been tested on all smartphone models. Visit the application pages within your smartphone's App store to view compatibility details.

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[www.redarcelectronics.com](http://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 products 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.

## 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

**RISK OF EXPLOSIVE GASES:** Working in vicinity of a Lead-Acid battery is dangerous. 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 Main Unit and Battery Monitor.

### ⚠ CAUTION

1. The Main Unit and Battery Monitor 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 Main Unit and Battery Monitor.
2. DO NOT alter or disassemble the Main Unit or Battery Monitor under any circumstances. All faulty units must be returned to REDARC for repair. Incorrect handling or reassembly may result in a risk of electric shock or fire and may void the unit warranty.
3. Only use the Main Unit and Battery Monitor with standard automotive lead acid, calcium content, gel, AGM, SLI, deep cycle, heated or standard lithium iron phosphate (LiFePO<sub>4</sub>) type 12 V batteries.
4. When using the Main Unit to charge a lithium iron phosphate (LiFePO<sub>4</sub>) battery, only batteries that have an inbuilt battery management system featuring under and over voltage protection and cell balancing are suitable.
5. The heated lithium (H) charging profile should only be used with lithium batteries that have a functioning heating element. If unsure, the standard lithium (Li) charging profile must be used. Using the wrong charging profile may damage your heated lithium battery.
6. 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.

7. Check the manufacturer's data for your battery and ensure that the continuous current rating of the Main Unit does not exceed the manufacturer's recommended maximum charging current. The battery charge current can be configured to match the manufacturer's recommendations if required.
8. The Main Unit is not intended to supply power to a low voltage electrical system other than to charge a battery.
9. Cable and fuse sizes are specified by various codes and standards which depend on the type of vehicle the Main Unit and Battery Monitor is installed into. Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to the Main Unit or Battery Monitor 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 product.
10. 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.
11. NEVER smoke or allow a spark or flame in the vicinity of the battery or engine. This may cause the battery to explode.

## PERSONAL SAFETY PRECAUTIONS

To assist with the safe operation and use of the Main Unit and Battery Monitor when connected to the battery:

- a. **HOT SURFACE:** High amperage loads connected to the Battery Monitor can cause the terminals and metal components to become extremely hot. To avoid burns, do not touch the hot parts without suitable personal protective equipment.
- b. Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.



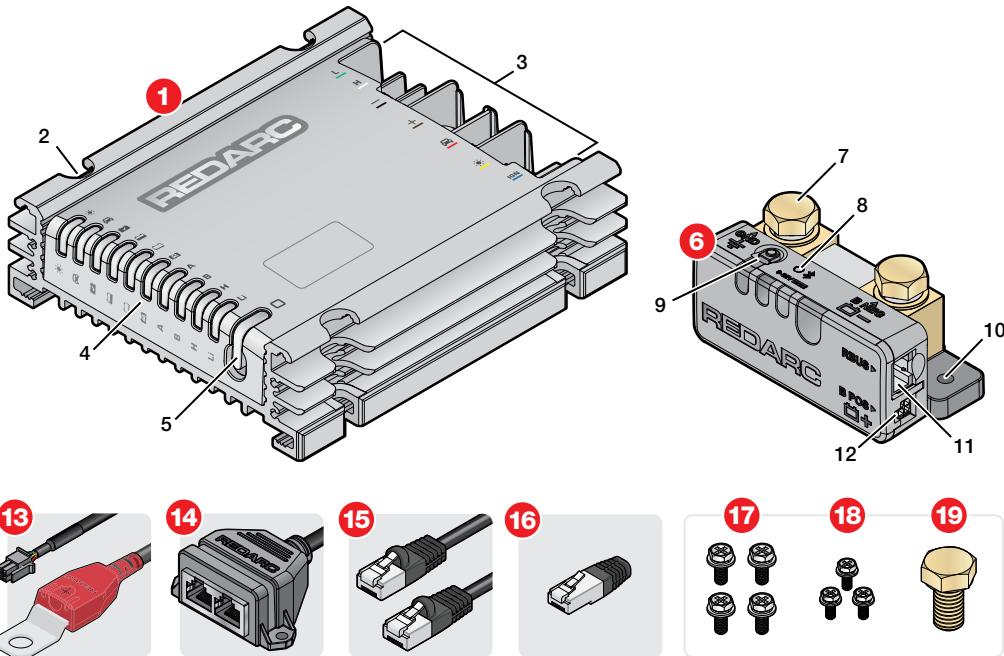
- c. If battery acid contacts your skin or clothing, remove the affected clothing and wash the affected area of your skin immediately with soap and water. If battery acid enters your eye, immediately flood the eye with running cold water for at least 10 minutes and seek medical assistance immediately.

### NOTICE

1. Keep the Main Unit and Battery Monitor away from major heat sources, high voltages, and avoid extended exposure to sunlight.
2. DO NOT install the Main Unit, Battery Monitor or R-Bus Wiring Adaptor in the engine bay, they are not designed to operate in engine bay environments.
3. The installer is responsible for applying the correct torque to the Terminal Bolts on the Battery Monitor. Over-torquing bolts may damage the Terminals.
4. DO NOT bottom-out the bolt threads when fastening Terminal Bolts to the Battery Monitor Terminals, this may cause a poor electrical connection.
5. For fastening lugs to the Main Unit Terminals, only use the supplied M3 x 8 mm / M5 x 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	<b>Main Unit</b>	1
2	Mounting Points (x4)	
3	Terminals	
4	Status LEDs	
5	Control Button	
<b>6</b>	<b>Smart Battery Monitor</b>	1
7	Terminal Bolts M10 x 16 mm (x2)	
8	Status LED	
9	Control Button	
10	Mounting Points (x2)	
11	R-Bus Socket	
12	Battery Sense Lead Socket	

Ref.	Part Description	Qty.
13	Battery Sense Lead — 1 m (3'3")	1
14	R-Bus Wiring Adaptor	1
15	R-Bus (RJ45) Cable — 2 m (6'7")	1
16	Terminating Resistor	1
17	M5 x 10 mm Hex Head Phillips Screw	4
18	M3 x 8 mm Hex Head Phillips Screw	3
19	M10 x 20 mm Alternative Terminal Bolt	1

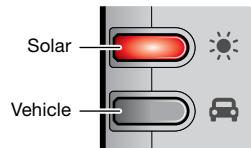
## MAIN UNIT PARTS

### STATUS LEDS

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

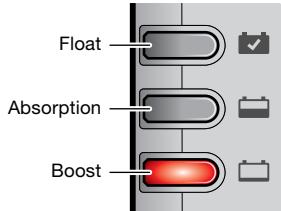
#### Solar and Vehicle LEDs

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 37](#) for information about each charging stage.



#### Chargeback LED

The Chargeback LED illuminates when the Start Battery Charge Mode ([page 33](#)) is enabled and active, or when Start Battery Recovery ([page 36](#)) is in progress.

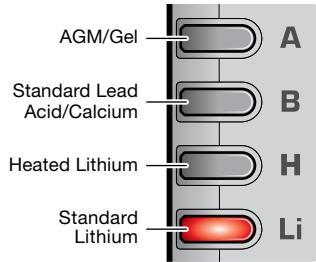


#### Charge Profile LEDs

The BCDC Alpha 50R can charge AGM/Gel (**A**), Standard Lead Acid/Calcium (**B**), Heated Lithium (**H**) and Standard Lithium (**Li**) batteries.

Configure the Charge Profile via the 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 40](#) for voltage specifications.



## CONTROL BUTTON

The Control Button controls the Main Unit and can be used to configure the essential battery charger settings.

To wake up the Main Unit, press and hold the Control Button until it turns green. 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.



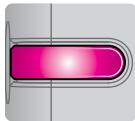
**Standby (off)**



**Start Battery Recovery (green)**  
see [page 36](#)



**Max Charge Currents (orange)**  
see [page 33](#)



**Battery Type (pink)**  
see [page 33](#)

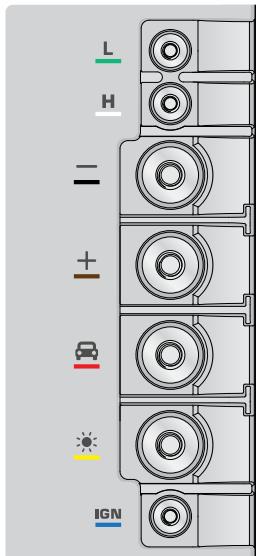


**Fault (red)**  
see [page 38](#)

## TERMINALS

The Main Unit has female screw terminals for easy connection of the input and output cables.

Refer to "Connect Cables to the Main Unit" (page 18) for torque information.



### R-Bus Input

Connects to the R-Bus Wiring Adaptor ([page 18](#)).

### Ground (M5)

Connects to the common ground ([page 19](#)).

### Auxiliary Battery (M5)

Connects to the auxiliary battery positive (+) terminal ([page 21](#)).

### Start Battery (M5)

Connects to the start battery positive (+) terminal ([page 22](#)).

### Solar (M5)

Connects to the solar panel positive (+) wire ([page 22](#)).

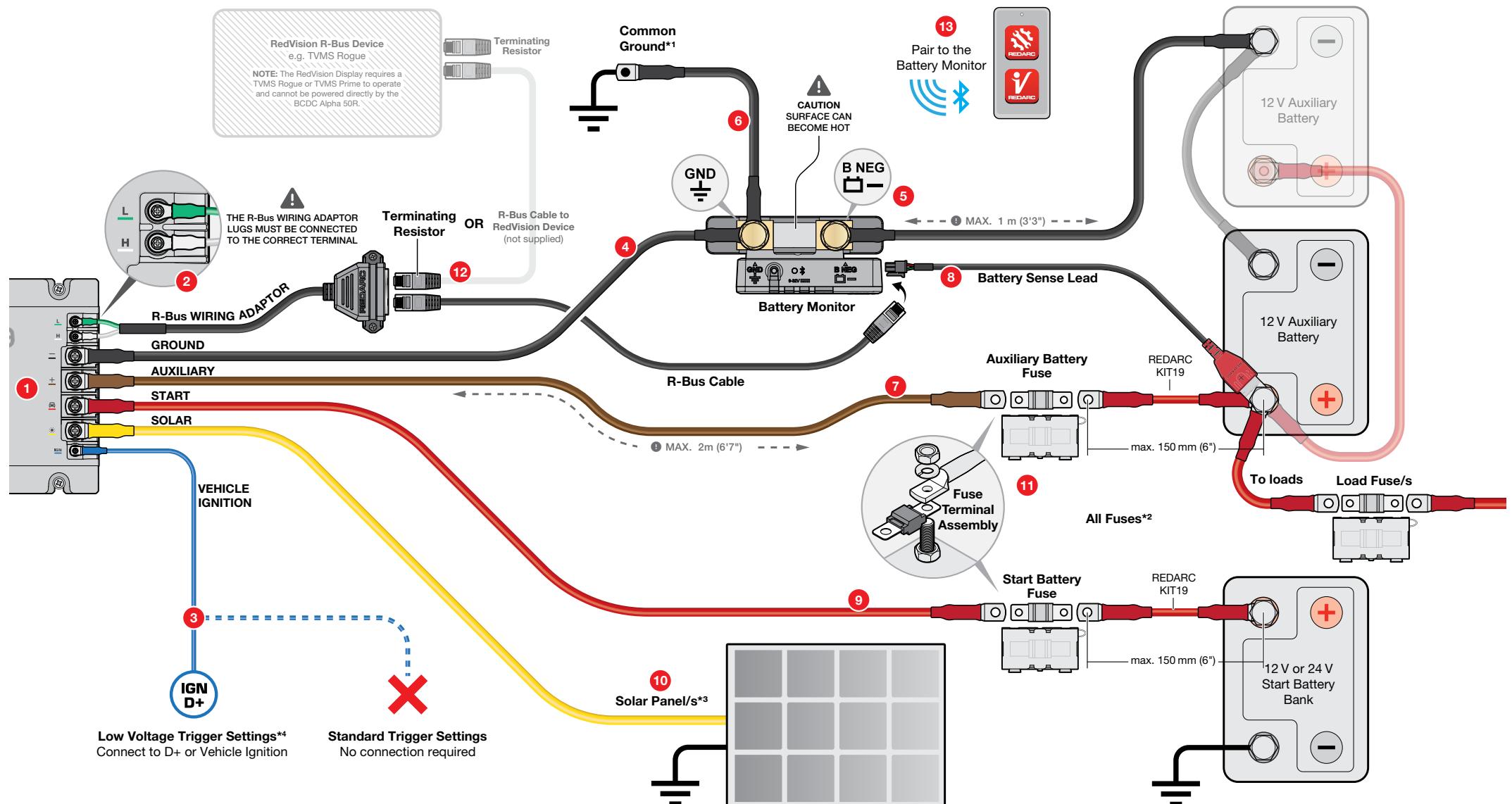
### Vehicle Ignition (M3)

Connects to an ignition signal for vehicles with smart alternators ([page 19](#)).

# TYPICAL BCDC ALPHA 50R SETUP

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

\*2 Fuses must be suitably rated for the cable gauge used. MIDI type fuses are recommended (see page 11).

\*3 Do not connect regulated solar panels, the BCDC Alpha 50R has an inbuilt MPPT regulator.

\*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 19).

# SYSTEM PLANNING

**⚠ 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 50R or other equipment installed in the system. The installer is responsible for ensuring that the correct cable sizes are used.

## WHAT YOU WILL NEED

### TOOLS

The tools listed may be required for mounting and wiring the BCDC Alpha 50R:

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

### CONSUMABLES

Components not included with the BCDC Alpha 50R may be required for mounting, wiring connections and cable management, including:

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

## CONSIDERATIONS BEFORE INSTALLING

### COMMON GROUND REQUIREMENTS

The Main Unit, Battery Monitor 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 or by a good quality connection to the vehicle chassis (if appropriate).

### Using a common ground busbar

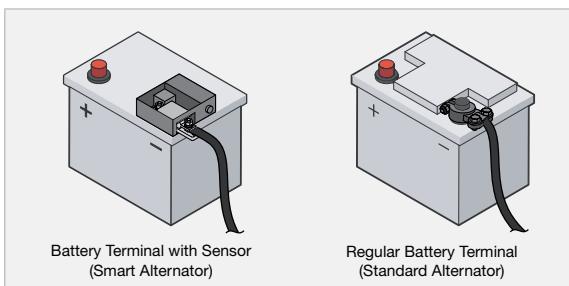
Consider the location of the busbar, ensuring it's mounted in a central location to avoid excessive cable runs. The common ground busbar must be capable of carrying all current loads — see "[Maximum Expected Currents](#)" (page 10) for further information.

### 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 the Main Unit 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.



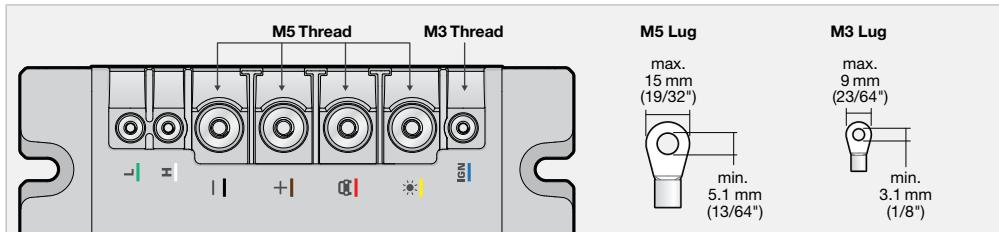
# MAIN UNIT REQUIREMENTS

## LUG SIZING

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.



## CABLE REQUIREMENTS

### 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. This table highlights the maximum current each cable connection can be expected to carry.

Terminal	Maximum Current
— Ground	55 A
± Auxiliary Battery	50 A
■ Start Battery	55 A
☀ Solar	55 A

### Ground Cable

The **Ground** cable should be no longer than 2m (6'7") in length and must be sized to conduct the full rated capacity of the BCDC Alpha 50R (55 A). 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 2m (6'7") 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 (page 28) or Control Button on the Main Unit (page 33).

### 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 50R's maximum solar input current (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.

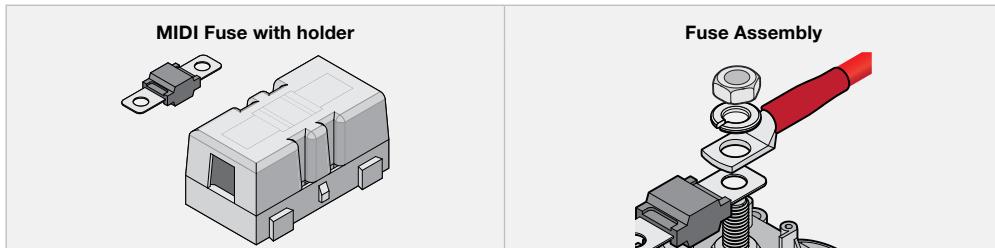
REDARC strongly recommends using good quality PVC V90HT or XLPE insulated cables.

Expected Current	MIDI Fuse Rating (REDARC Fuse Kit)		One-way Length		Cable Cross Sectional Area (mm <sup>2</sup> ) <sup>*2</sup>	Cable Gauge (AWG/B&S) <sup>*2</sup>
	Auxiliary Battery	Start Battery <sup>*1</sup>	0–2 m	0–6'7"		
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.



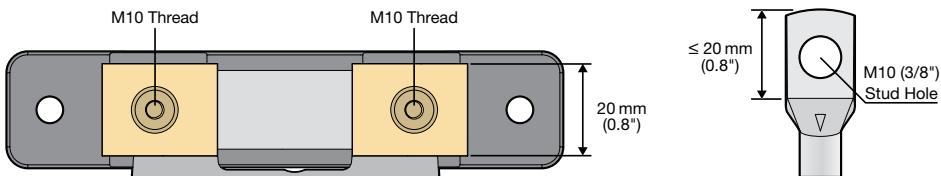
# BATTERY MONITOR REQUIREMENTS

## LUG SIZING

The **Ground (GND )** and **Battery Negative (B NEG  -)** terminals on the Battery Monitor have M10 screw threads. Select lugs for a 10 mm (3/8") stud and a cable barrel that suits the required cable gauge.

The **Ground (GND )** terminal is capable of connecting multiple loads, for important lug requirements and instructions see "[Connecting Multiple Lugs](#)" (page 13).

**NOTE:** If installing the lugs to the Battery Monitor terminals facing downwards, select a lug with a tongue that is long enough to cover the shunt surface. This is to ensure that there is no interference between the ramped section of the lug and the shunt. See "[Strain-Relief and Cable Management](#)" (page 26).



## CABLE SIZING

**⚠ CAUTION:** If undersized cables are used, overheating of cables could cause damage (including fire) and charging performance will likely be compromised.

Appropriate cables are required for the **Battery Negative (B NEG  -)** and **Ground (GND )** terminals on the Battery Monitor. These cables are used to connect the Battery Monitor to the auxiliary battery and to the common ground — see [page 20](#).

### Battery Negative Cable

The **Battery Negative** cable should be no longer than 1 m (3'3") to minimise the voltage drop between the Battery Monitor and auxiliary battery. Refer to the table below to determine a suitable cable gauge for this connection based on the current your system has.

**NOTE:** Your auxiliary battery's negative connection is made via the **Battery Negative (B NEG  -)** terminal.

**IMPORTANT:** The following table should be used as a reference only, considerations when selecting an appropriate cable for your installation include:

- Cable length
- Peak current draw
- Time spent at high current
- Environment ambient temperature

System Current	100 A	200 A	300 A	400 A	500 A
<b>Maximum Cable Length</b>	1 m (3'3")				
<b>Recommended Cable Cross Section</b>	35 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>	150 mm <sup>2</sup>
<b>Closest Equivalent AWG/BAE/B&amp;S</b>	2	3/0	4/0	250 kcmil	300 kcmil

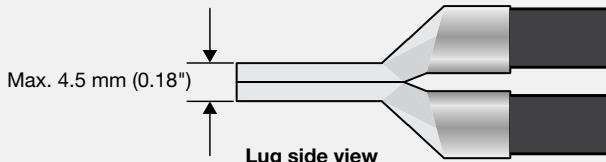
# CONNECTING MULTIPLE LUGS

## MAIN UNIT CONDITIONS

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

- You only use the supplied M3 x 8 mm or M5 x 10 mm screws. 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.

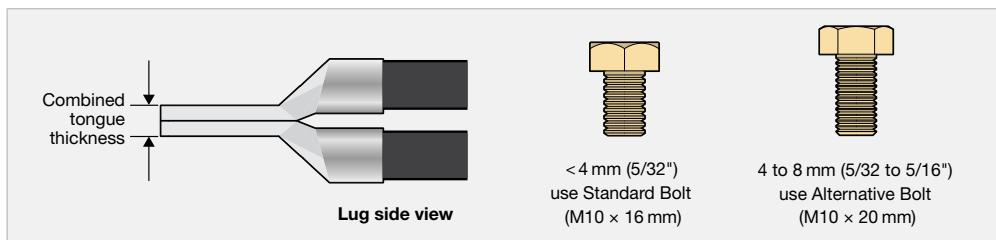


## BATTERY MONITOR CONDITIONS

**⚠ CAUTION:** Do not use the Battery Monitor outside the supplied recommendations. Exceeding the recommendations could damage the Battery Monitor and/or other equipment installed in the system. The installer is responsible for ensuring the correct bolt size and Ground cable size is used.

The Battery Monitor is capable of connecting multiple loads to the **Ground (GND )** terminal. Depending on your system setup, you may need to use the supplied Alternative Terminal Bolt (M10 x 20 mm). Refer to the table to determine if this Bolt is required. The lugs belonging to circuits with the highest currents should be closest to the Battery Monitor terminal.

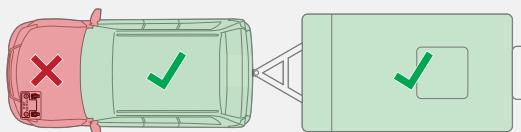
Bolt Size (supplied)	Combined Thickness of Lug Tongues	
	Minimum	Maximum
Standard M10 x 16 mm	-	4 mm (5/32")
Alternative M10 x 20 mm	4 mm (5/32")	8 mm (5/16")



# INSTALLATION – MOUNTING

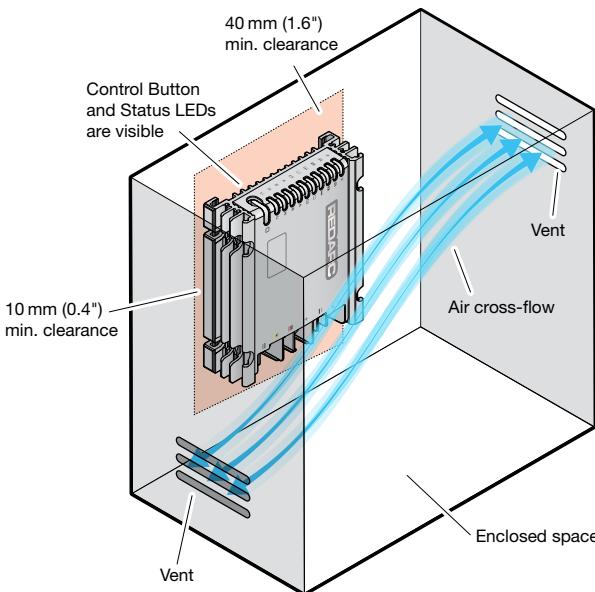
## GENERAL MOUNTING REQUIREMENTS

**NOTICE: DO NOT** install the Main Unit and Battery Monitor in the engine bay. These parts are not designed to operate in engine bay environments.



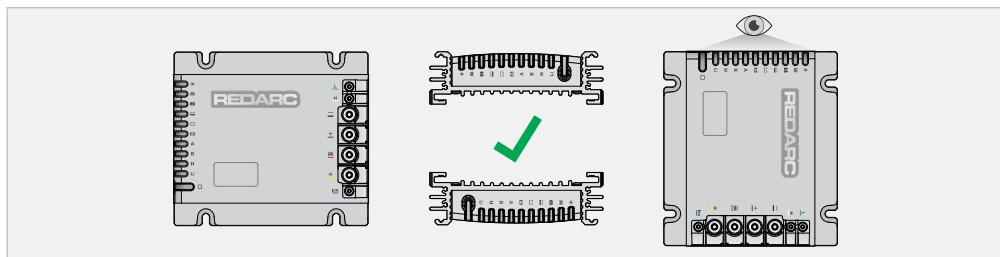
The Main Unit and Battery Monitor are only rated for indoor installations in any liveable areas of the vehicle or caravan/camper trailers.

- Avoid using excessive cable lengths by first testing that all cables will comfortably reach each component correctly in your setup.
- Mount in a location that is dry, clean and is not prone to high humidity. Liquid or condensation entering into the Main Unit and Battery Monitor may cause irreparable damage.
- Mount the system to fixed surfaces that have adequate strength to support it 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.
- Ensure there is adequate space around the Main Unit and Battery Monitor for strain-relief, cable management and operation of the BCDC Alpha 50R (see ["Strain-Relief and Cable Management" \(page 26\)](#)).
- If installing the Main Unit and Battery Monitor in an enclosed space, two vents should ideally be positioned at opposite ends of the enclosure for cross-flow of air as demonstrated below. Failure to adequately ventilate can cause overheating, leading to degraded performance.



## MOUNTING THE MAIN UNIT

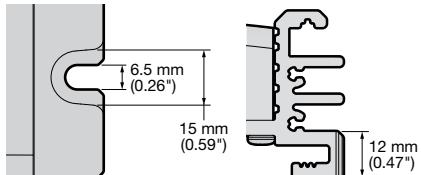
- Do not mount in an orientation that allows liquid to pool at the terminals, this could damage the Main Unit and other components in the system. The Main Unit can be mounted in any other orientation.
- Leave clearance of at least 10 mm (0.4") on the sides and 40 mm (1.6") at each end of the Main Unit.
- Do not mount the Main Unit near surfaces or objects that become hot.



## 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.**

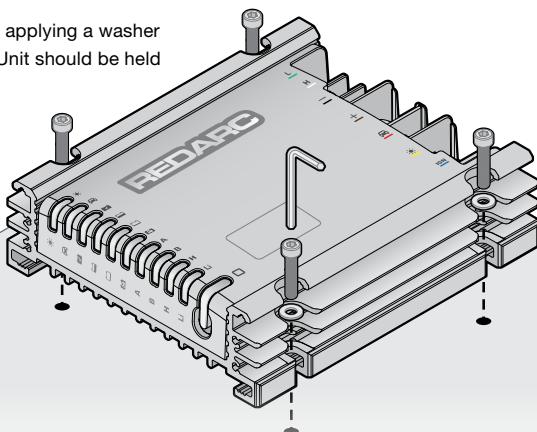


## MOUNTING STEPS

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



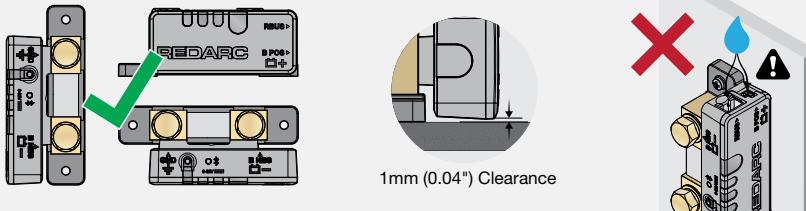
1. Place the Main Unit in its final position and carefully mark the centre of each mounting hole. Refer to [page 40](#) for mounting hole spacing dimensions.
2. Remove the Main Unit and drill clearance/pilot holes. De-burr the drilled holes and clear away swarf. Touch up any bare metal surfaces that 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.



## MOUNTING THE BATTERY MONITOR

**⚠ HOT SURFACE:** High amperage loads connected to the Battery Monitor can cause the terminal/metal components to become extremely hot. For this reason, the installer is responsible to **leave at least 30 mm (1.2") of clearance on all sides and above the Battery Monitor** to allow for air-flow.

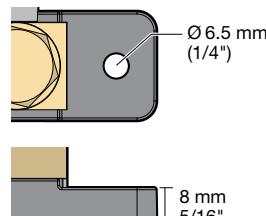
- The Battery Monitor can be mounted in any orientation except with the **RBUS** and **B POS (⊕ +)** sockets facing upwards, to prevent condensations/liquids from running into the Battery Monitor.
- Ensure the main housing is clear from any protrusions (1 mm (0.04") clearance).



### MOUNTING HARDWARE

When mounting the Battery Monitor, both Mounting Points must be used. REDARC recommend using M6 (1/4") to M4 (8#) fasteners with washers.

Ensure the selected fasteners are suitable for the mounting surface and there is clearance-fit through the Mounting Points on the Battery Monitor.

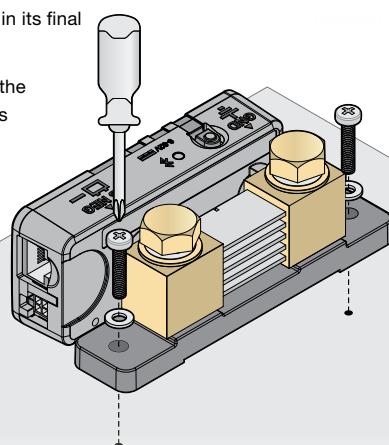


### MOUNTING STEPS

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



1. Confirm clearances around the Battery Monitor are adequate.
2. If clearance/pilot holes need to be drilled, place the Battery Monitor in its final and carefully mark the centre of each Mounting Point.
3. Remove the Battery Monitor 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.
4. Fasten the Battery Monitor in place, applying a washer in between the fastener and the Mounting Point.



# 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.

**NOTICE:**

- The installer is responsible for applying the correct torque to the Terminal Bolts. Over-torquing bolts may damage the terminals.
- Do not bottom-out thread when fastening the Terminal Bolts into the terminal, this may cause a poor electrical connection.

## 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.



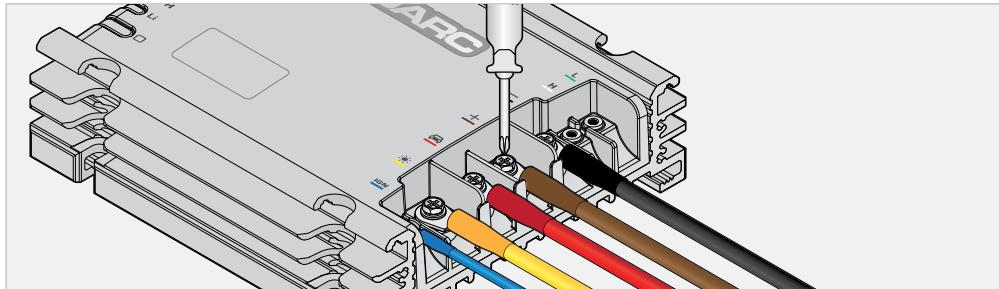
## CONNECT CABLES TO THE MAIN UNIT

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 **Vehicle Ignition** (if required) cable to the terminal using the supplied M3 Hex Head Phillips Screw. Torque to 1 N·m (0.74 lbf·ft).

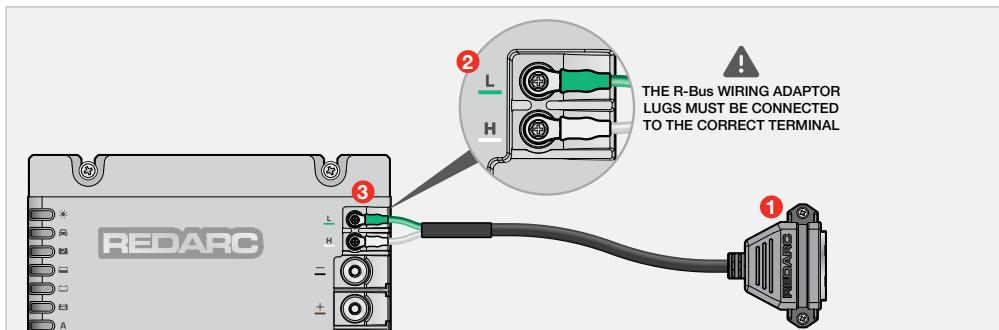
**WARNING:** Ensure accurate torquing of the terminal screws. Over-torquing can cause damage to the terminal threads. Under-torquing leads to loose screws which can create a high-resistance connection that could overheat, damaging the Main Unit and wiring, or could cause a fire.

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



## R-BUS WIRING ADAPTOR TO MAIN UNIT

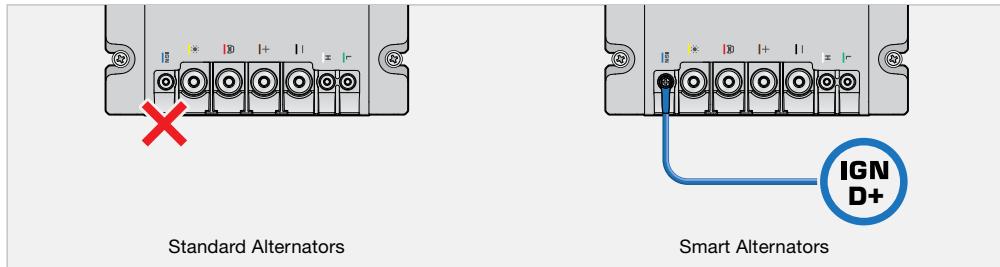
1. Mount the R-Bus Wiring Adaptor using two M4 fasteners or 4 mm (0.15") wide cable ties. Ensure the Adaptor reaches comfortably to the R-Bus Terminal on the Main Unit.
2. Connect the **Green** cable lug to the **L** terminal and the **White** cable to the **H** terminal on the Main Unit.
3. Secure using two M3 Screws, torque to 1 N·m (0.74 lbf·ft).



## VEHICLE IGNITION CABLE CONNECTION

The **Vehicle Ignition** connection allows vehicles with variable-voltage alternators to trigger the Main Unit to start or stop charging the auxiliary battery from the start battery. Refer to "Identifying Your Vehicle's Alternator Type" (page 9), then connect the **Vehicle Ignition** cable depending on your alternator type:

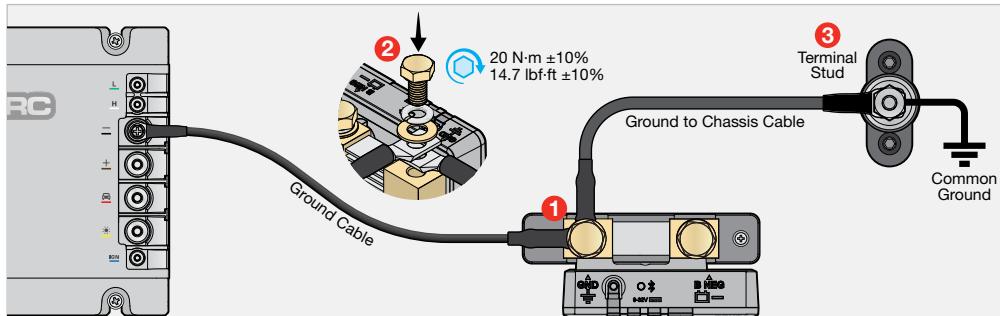
- **Fixed-voltage alternator or temperature compensating alternator (standard alternator)** — not required (leave disconnected).
- **Variable-voltage alternator (smart alternator)** — connect to a point that is live only when the ignition is turned on.
- **Idle-stop vehicles (smart alternator)** — connect 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 CONNECTIONS

1. Remove the M10 Bolt and washers from the **Ground (GND  $\perp$ )** terminal on the Battery Monitor.
2. Align the **Ground** and **Ground to Chassis** lug stud hole to the **Ground (GND  $\perp$ )** terminal on the Battery Monitor. Fasten using the flat washer, spring washer and bolt, torque to 20 N·m (14.7 lbf·ft  $\pm 10\%$ ).
3. Connect the **Ground to Chassis** cable to a point that forms a common ground with all components in your setup, commonly the vehicle's chassis or the metal of the vehicle body.

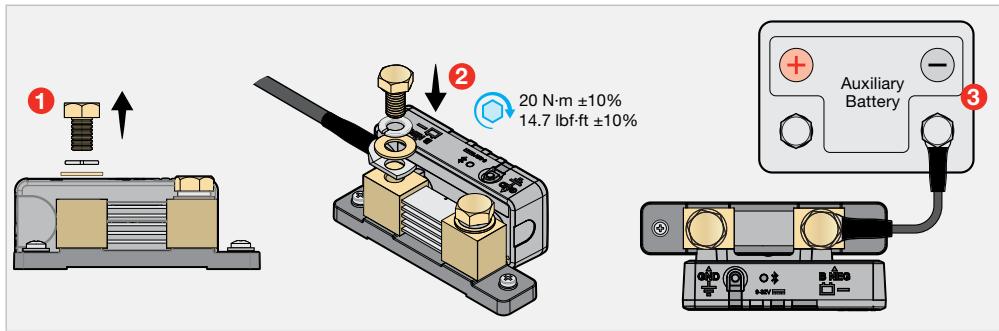
When connecting multiple lugs to the Main Unit and Battery Monitor ground terminals note that the connections must meet all requirements in "Connecting Multiple Lugs" (page 13).



## BATTERY NEGATIVE (B NEG) CABLE CONNECTION

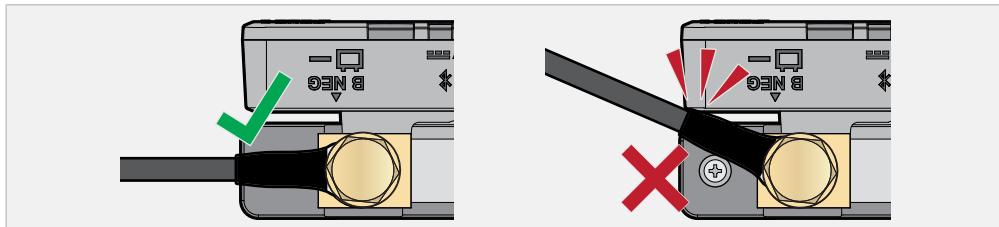
1. Remove the M10 Bolt and washers from the **Battery Negative (B NEG)** terminal.
2. Align the lug stud hole with the terminal and fasten using the flat washer, spring washer and bolt. Torque to 20 N·m (14.7 lbf·ft).
3. Connect the **Battery Negative** cable to the auxiliary battery negative (–) terminal using appropriate fasteners.

**NOTE:** The **Battery Negative** cable should not exceed 1m (3'3") to minimise voltage drop between the Battery Monitor and auxiliary battery.



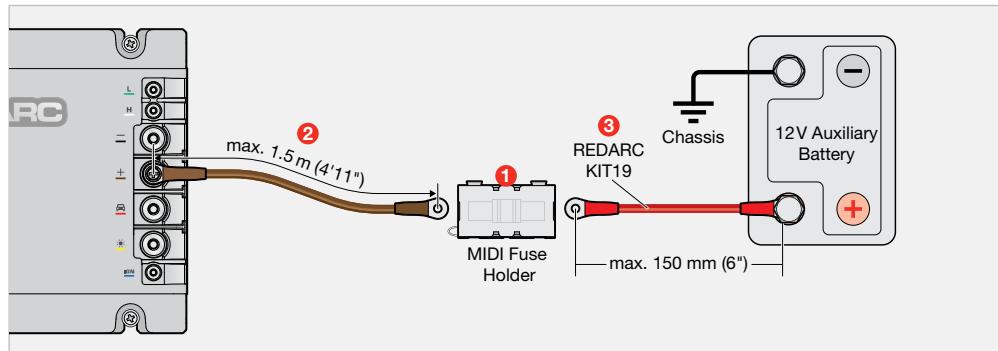
## CORRECT LUG FITMENT

Hold the **Ground** and **Battery Negative** cables when torquing to avoid the cables touching the Battery Monitor Housing, this will prevent from potentially damaging the Battery Monitor.



## AUXILIARY BATTERY CABLE

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.

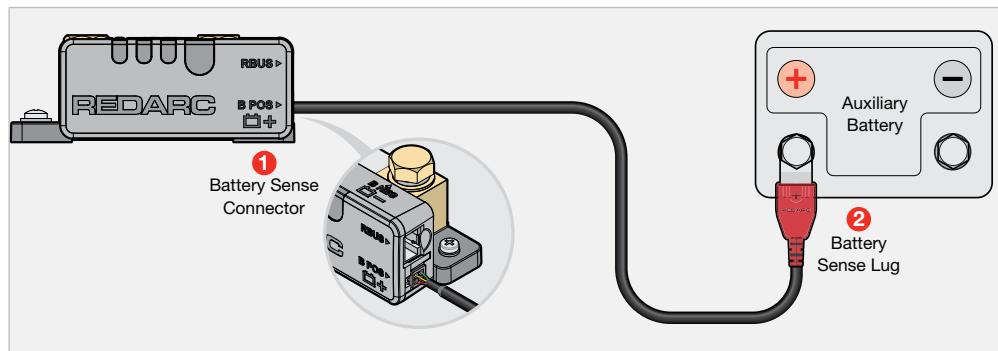


## BATTERY SENSE LEAD

1. Insert the Battery Sense Connector to the **B POS** (⎓ +) socket on the Battery Monitor.
2. Connect the Battery Sense Lug to the auxiliary battery positive (+) terminal using appropriate fasteners to secure.

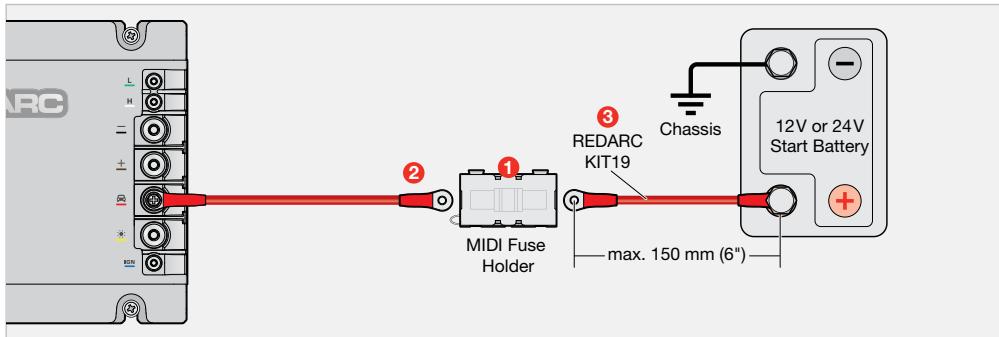
**NOTICE:** Do not fit the Battery Sense Lead between the auxiliary battery and lugs carrying high currents.

Connect the lugs carrying high-currents to the auxiliary battery first, then add the Battery Sense Lug on top (last).



## 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.

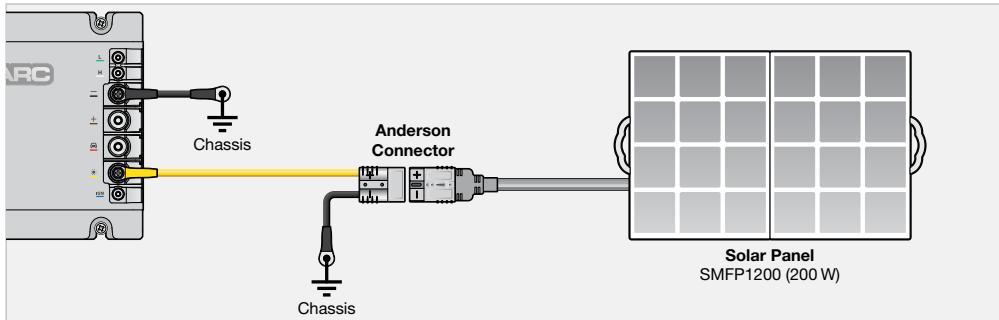
**NOTICE:** DO NOT connect solar panels that have inbuilt regulators or use a supplementary external regulator. The BCDC Alpha has an inbuilt MPPT regulator that may not function correctly if regulated solar panels are connected.

The BCDC Alpha 50R 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 22)
- "Connecting 1 to 2 solar panels parallel" (page 23)
- "Connecting more than 2 solar panels in parallel" (page 24)

## CONNECTING A SINGLE SOLAR PANEL



## CONNECTING MULTIPLE PANELS

The BCDC Alpha 50R 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:

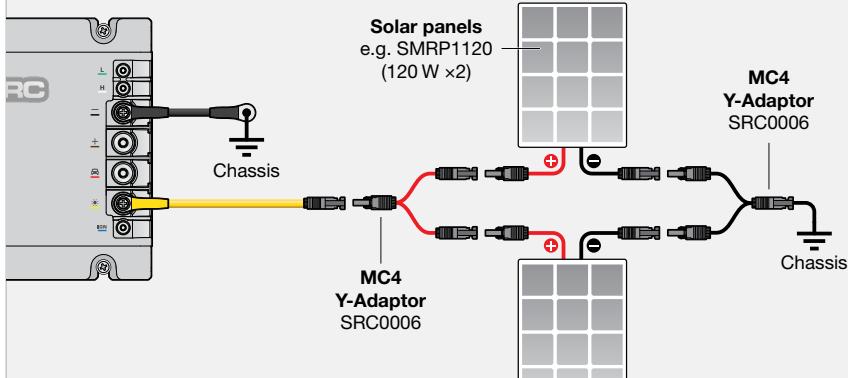
- The open circuit voltage of the array is below the 48V maximum solar input voltage range ([page 41](#)) of the BCDC Alpha at minimum ambient temperature.
- The total rated power is below the maximum array size ([page 41](#)) rating of the BCDC Alpha.
- All solar panels are the same.
- All solar panels are pointing in the same direction.

### Connecting 1 to 2 solar panels 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

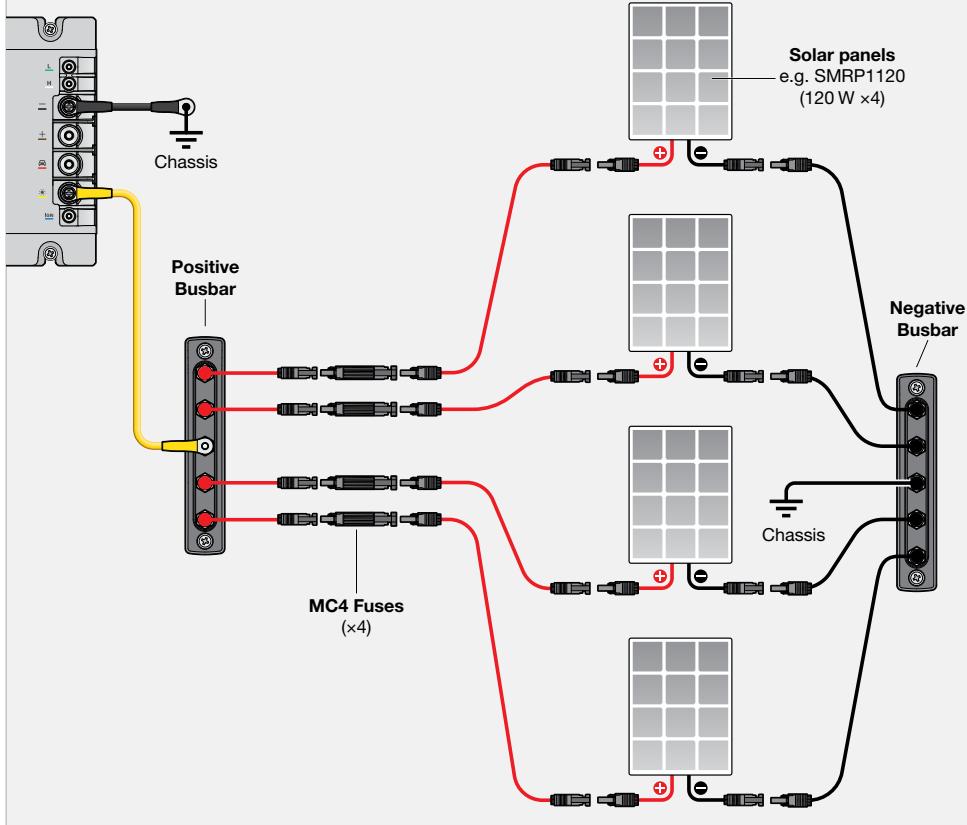


## Connecting more than 2 solar panels in parallel

When connecting more than 2 solar panels in parallel, it is important the solar connection meets requirements on [page 23](#) 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 1.5x 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.

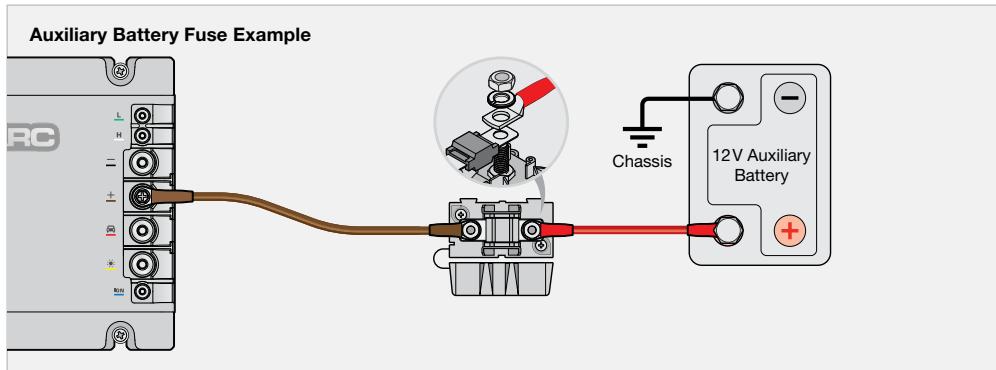
### 4 Solar Panels in Parallel Example



## FUSE CONNECTIONS

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

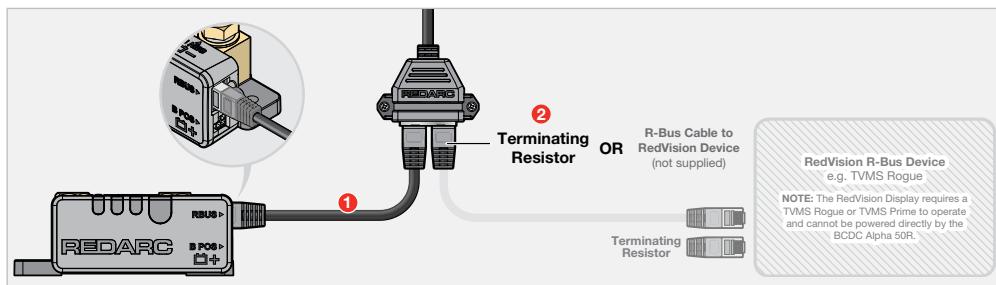
Then, install and secure the start battery MIDI fuse to the fuse holder to complete the **Start Battery** cable connection.



## CONNECT REDVISION R-BUS DEVICES

1. Connect the R-Bus cable into the R-Bus Wiring Adaptor and to the R-Bus socket on the Battery Monitor.
2. Insert the Terminating Resistor into the R-Bus Wiring Adaptor or into another R-Bus device to expand your RedVision system.

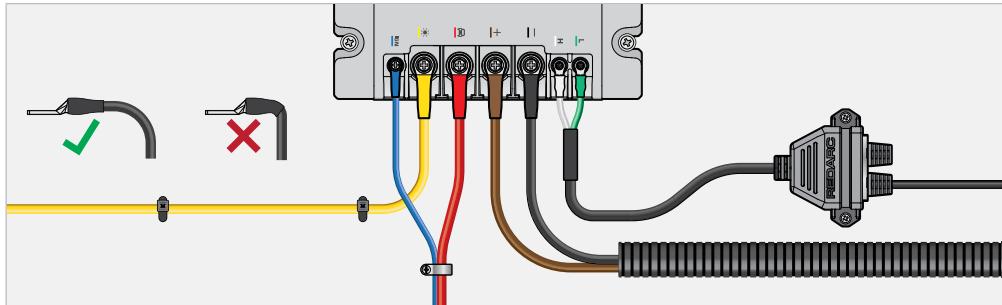
**NOTE:** The RedVision Display requires a TVMS Rogue or TVMS Prime to operate and cannot be powered directly by the BCDC Alpha 50R.



# STRAIN-RELIEF AND CABLE MANAGEMENT

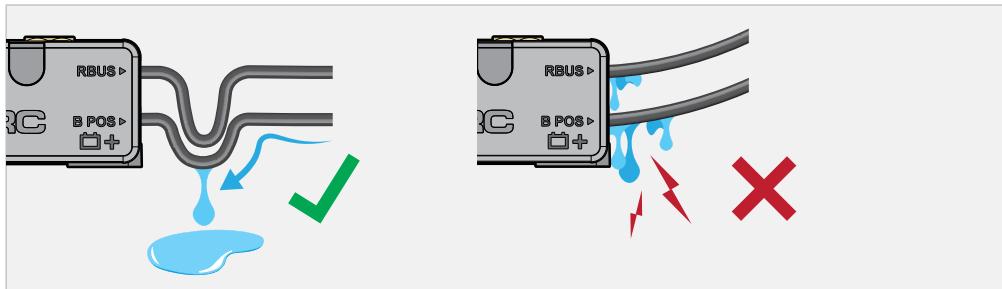
## PROTECT AND SECURE THE CABLES

- 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 and Battery Monitor — 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.



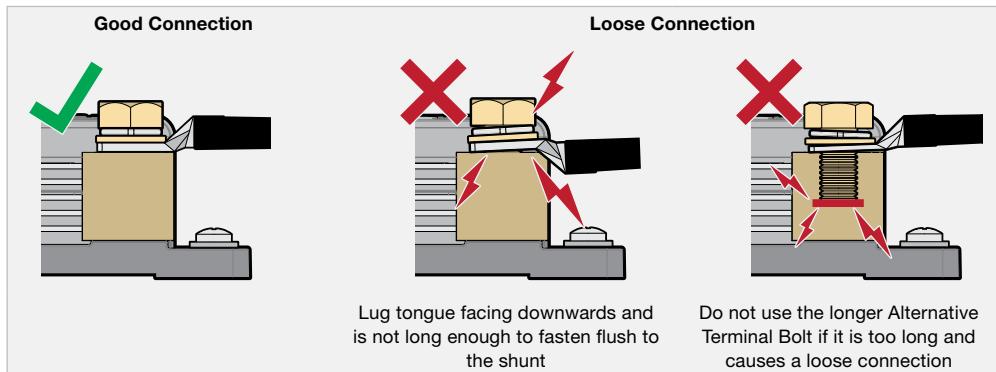
## PREVENT WATER ENTRY

Ensure that the cables are routed with drip loops where required, this is to prevent moisture from running down the cables into the Main Unit and Battery Monitor.



## BATTERY MONITOR CABLE MANAGEMENT

**IMPORTANT:** Ensure lugs are fastened firmly against the top face of the terminal. Loose lugs will have a bad electrical connection, causing inaccurate readings from the Battery Monitor, and can result in damage to the wiring and Battery Monitor.



## 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.
- Do not use solvents, alcohol or domestic cleaning products to clean the Main Unit and Battery Monitor. If sand, grit or dirt accumulate on the devices, wipe it clean with a slightly damp cloth.
- Do not allow the devices to come in contact with corrosive substances.
- Do not pressure wash the Main Unit and Battery Monitor.

# SYSTEM CONFIGURATION

Once installed, configure the system to define the BCDC Alpha 50R's behaviours and operation, and your auxiliary batteries specifications. Essential settings can be configured via the Control Button, while additional settings are available via the Configurator App.

## CONFIGURE VIA THE MAIN UNIT CONTROL BUTTON

When power is first applied to the Main Unit, the Control Button will flash white, and all LEDs will illuminate red for approximately 5 seconds. The "Li" LED will begin flashing red to indicate that the system needs configuring.

To confirm default settings, use the Control Button to set the Battery Type (page 30). The Control Button can also be used to alter the Current Limits (Max Charge Current and Vehicle Input Current) (page 34). If further configuration is required, the Configuration App must be used.

See "Main Unit User Interface" (page 33) for further information on operating the Main Unit Control Button.

## CALIBRATION

When the battery is first connected, the system will start a calibration process to determine the State of Charge (SoC) of the battery — this value does not appear instantly after completing your installation. Calibration will continue until your auxiliary battery is fully charged.

## DEFAULT SETTINGS

<b>Battery Type<sup>1</sup></b>	Gel
<b>Battery Size<sup>1</sup></b>	100 Ah
<b>Max Charge Current</b>	50 A
<b>Low SoC Alarm</b>	25%
<b>Low Voltage Alarm</b>	9 V
<b>Vehicle Input Trigger</b>	Auto
<b>Vehicle Input Current Limit</b>	55 A
<b>Start Battery Charge Mode</b>	Disabled

<sup>1</sup> 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 50R 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 on the Battery Monitor for 0.5 to 3 seconds. The Status LED will flash blue.
3. Open the Configurator App and allow the required permissions.
4. In the "Choose System" screen, tap "Read Device" then select the system that matches the Product Serial Number on the Battery Monitor.
5. When the "Pair" banner appears, tap Pair.
6. You are now ready to configure your BCDC Alpha 50R — proceed to [page 29](#).

## Configure the Battery Monitor via the App

7. Under the "Charger Settings" heading tap "Battery Sensor" to navigate to the "Configure Battery Sensor" screen.
8. Under the "Battery Settings" heading, enter your auxiliary battery's specifications:
  - **Battery Type** (page 30)
  - **Battery Size** (page 30)
  - **Max Charge Current** (page 30)
  - **Nominal Battery Voltage** — This **MUST** be set to '12V'.
9. Under the "Alarms" heading, configure the Alarm Settings:
  - **Low SoC Alarm** (page 30)
  - **Low Voltage Alarm** (page 30)
10. Once all settings have been configured, tap **Save** .

## CONFIGURE THE CHARGER UNIT VIA THE APP

11. Under the "Charger Settings" heading tap "Charger Unit" to navigate to the "Configure BCDC Alpha" screen.
12. Enter in the Charger Unit settings:
  - **Vehicle Input Trigger** (page 31)
  - **Vehicle Input Current Limit** (page 31)
  - **Start Battery Charge Mode** (page 32)
13. Once all settings have been configured, tap **Save** .

## COMPLETE CONFIGURATION VIA THE APP

14. Make sure the Battery Monitor is in Bluetooth pairing mode, then tap **Program** .
15. In the "Choose System" screen, re-select your system. Do not exit the App until the success banner appears and the Status LED on the Battery Monitor is solid Blue.

The system is now configured, and Bluetooth pairing is complete.

## 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** .

## 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.

LED	App Setting	
<b>A</b>	AGM	Gel (default)
<b>B</b>	Standard Lead Acid	Calcium
<b>H</b>	Heated Lithium	
<b>Li</b>	Standard Lithium	

**Configure via:** App or Main Unit Control Button (see "Main Unit User Interface" (page 33))

## 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 increments

## 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 (50 A). Ensure the **Auxiliary Battery** cable size and fuse size installed is capable of carrying this configuration.

**Configure via:** App or Main Unit Control Button (see "Main Unit User Interface" (page 33))

**Default setting:** 100% of the maximum input current (50 A)

**Settings:** 4 A to 50 A in increments of 1 A

## SET THE LOW SoC ALARM

The Low SoC Alarm alerts you when the auxiliary battery state of charge drops below the configured percentage. In the event of a low SoC, the **Float**  Status LED on the Main Unit will flash red and an alert will be displayed in the RedVision App — see "Faults" (page 38).

**Configure via:** App only

**Default setting:** 25%

**Settings:** 0% to 100% in increments of 1%

## 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 38).

**Configure via:** App only

**Default setting:** 9 V

**Settings:** 8.0 V to 30.0 V in increments of 0.1 V

## 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 12V or 24V and operates within the 12/24V parameters explained below. **Auto** is suitable for most vehicle alternators.
- **12V** — for a 12V vehicle system and prevents the Main Unit from going into 24V mode.
- **24V** — for a 24V vehicle system and prevents the Main Unit from going into 12V mode.
- **Ignition** — for non-standard systems between 9V and 32V. The BCDC Alpha 50R 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 9V and 32V.

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

**\*1** If your vehicle has a smart alternator, the Vehicle Ignition cable connection is required for the start battery to provide charge effectively — see [page 19](#). To identify your alternator type, see [page 9](#).

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

## 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 50R (55A). Ensure the **Start Battery** cable size and fuse size installed is capable of carrying this configuration.

**Configure via:** App or Main Unit Control Button (see "[Main Unit User Interface](#)" (page 33))

**Default setting:** 100% of the maximum input current (55A)

**Settings:** 5A to 55A in increments of 1A

## 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 37)).

**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 12.8V.

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

## 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**.

# MAIN UNIT USER INTERFACE

The Control Button controls the Main Unit and can be used to configure the essential battery charger settings.

To confirm default settings, use the Control Button to set the Battery Type. The Control Button can also be used to alter the Current Limits (Max Charge Current and Vehicle Input Current) ([page 34](#)). If further configuration is required, the Configuration App must be used.



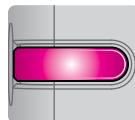
Standby (off)



Start Battery Recovery (green)  
see [page 36](#)



Max Charge Currents (orange)



Battery Type (pink)



Fault (red)  
see [page 38](#)

## SET THE BATTERY TYPE

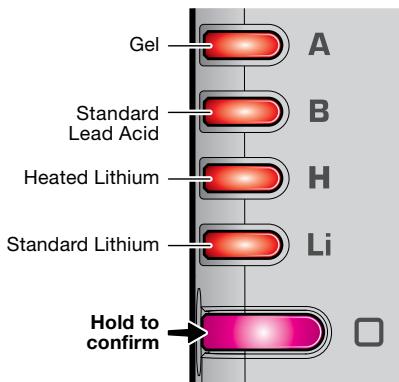
The Battery Type setting must match the chemistry of your auxiliary battery (refer to the manufacturer's specifications).

It makes sure that the correct charging profile is used for your battery's chemistry type.

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

## SET VIA THE CONTROL BUTTON

1. Press and hold the Control Button until it turns **green**, 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 CURRENT LIMITS

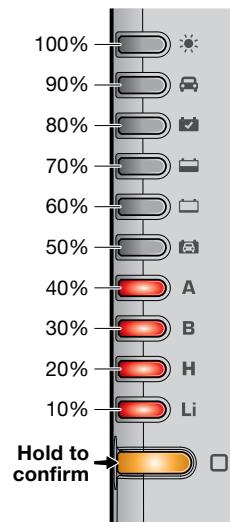
Using the Control Button sets both Charge Currents (**Vehicle Input Current Limit** and **Max Charge Current**) simultaneously — to set different values, use the Configurator App.

Ensure the **Auxiliary Battery** and **Start Battery** cable size and fuse size installed is capable of carrying this configuration.

1. Press and hold the Control Button until it turns **green**, 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.

### 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.



# OPERATION

## PAIR TO THE REDVISION® APP



### Get the RedVision® App

The RedVision® App gives you remote access to the BCDC Alpha 50R'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 on the Battery Monitor for 0.5 to 3 seconds. The Status LED will flash blue (pairing mode).
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. Find and select the device that matches the Product Serial Number on your Battery Monitor.  
Read and agree to the disclaimer.
6. When the Bluetooth pairing request appears, tap **Pair** (first time pairing may take a few minutes).
7. Once the Status LED turns solid blue, and the system information appears on your smartphone the Bluetooth pairing is complete (first time pairing may take a few minutes).

### SUBSEQUENT CONNECTIONS

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

### PAIRING MULTIPLE SMARTPHONES

The BCDC Alpha 50R 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" \(page 35\)](#).

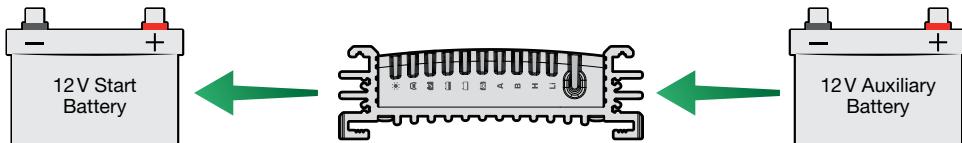
## START BATTERY RECOVERY

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 11.5V.

The start battery input on the BCDC Alpha 50R 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 50R delivers 50A 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 14.6V.

**NOTE:** Start Battery Recovery is only available for 12V 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 31).



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 system.
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 MAIN UNIT

1. Press and hold the Control Button until it turns **green**.
2. To begin the Recovery process when the Control Button is **flashing green**, press and hold the Control Button again until it turns **solid green**. The **Chargeback LED**  will illuminate **solid red** while the start battery is charging (approximately 15 minutes).
3. **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 38) for troubleshooting.

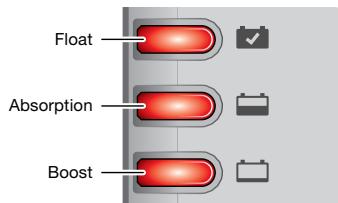
## CHARGING STAGES

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.

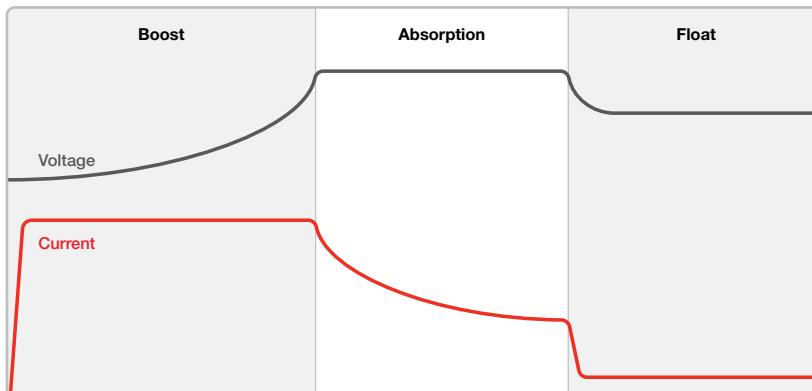


### ABSORPTION

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 4A (or 4% of the configured auxiliary battery capacity in Ah, whichever is greater) for 5 minutes. Once this occurs the Main Unit moves into the Float stage.

### FLOAT

In the Float stage, the Main Unit maintains 13.3V (13.6V 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 50R 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.

# 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.

Hard Fault 

Soft Fault 



**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 41](#) 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 41](#) for operating range specifications.



**Low SoC Alarm** — Soft fault indicating your auxiliary battery is below the Low SoC Alarm configured via the App, see [page 30](#).

**Low Voltage Alarm** — Soft fault indicating your auxiliary battery is below the Low Voltage Alarm configured via the App, see [page 30](#).

**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 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 41](#).



**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 41](#).



**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 and 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 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 41](#). 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.



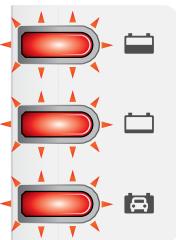
**Reverse Polarity Detected** — A hard fault indicating incorrect system wiring. Check system wiring, if the fault persists, contact REDARC technical support.

**Bad Wiring Fault** — A hard fault indicating a significant voltage drop between the Battery Monitor and Main Unit (likely from poor cabling between the two devices). This fault must be cleared in the RedVision App or by pressing the Control Button before charging can resume.

**Battery Disconnected** — A hard fault indicating the battery is disconnected from the Main Unit likely from the battery being isolated. This will clear once the isolation switch is no longer in use if it persists contact REDARC technical support.



**Configuration Fault** — A soft fault indicating the Battery Monitor has not been configured, see [page 28](#) for configuration instructions.



**Battery Monitor Disconnected** — A soft fault indicating the Battery Monitor communications cable has broken or become disconnected. This fault is indicated by one of the Charging Stage LED corresponding to the current charging stage.

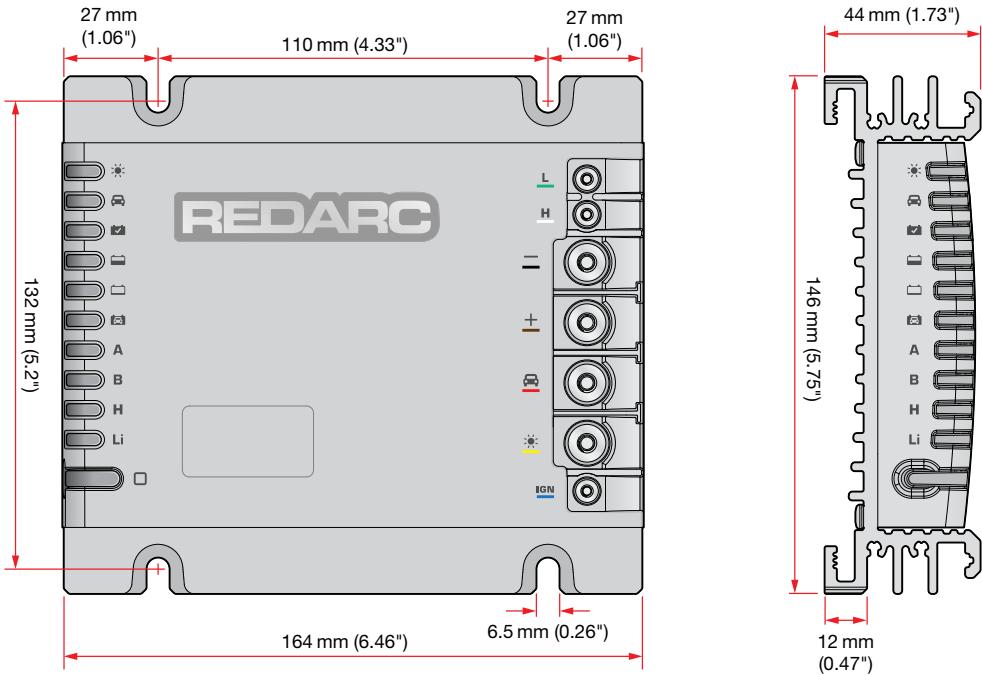
# SPECIFICATIONS

## MAIN UNIT SPECIFICATIONS

### GENERAL SPECIFICATIONS

#### BCDC12050R

Weight	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

Nominal Current Rating	50 A
Operating Temperature* <sup>1</sup>	−20°C to 60°C (−4°F to 140°F)
<b>Start Battery Input</b>	
Voltage Range	9 to 32 VDC $\equiv$
Maximum Input Current	55 A
<b>Solar Input</b>	
Voltage Range* <sup>2</sup>	9 to 48 VDC $\equiv$
Maximum Input Current	55 A
Maximum Array Size	1000 W
<b>Output</b>	
Nominal Output Voltage	12 V
Voltage Range	9 to 16 VDC $\equiv$
Maximum Output Current	50 A
Recommended Battery Capacity	50 to 600 Ah
Maximum Output Power	800 W

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

Battery Type	Storage Mode	Touring Mode	Float
AGM / Gel	14.2 V	14.2 V	13.3 V
Calcium	16 V	15 V	13.3 V
Standard Lead Acid	15.5 V	14.6 V	13.3 V
Heated and Standard Lithium	14.2 V	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 <sub>4</sub>	0°C to 60°C (32°F to 140°F)
Heated LiFePO <sub>4</sub> * <sup>3</sup>	−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 to 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.

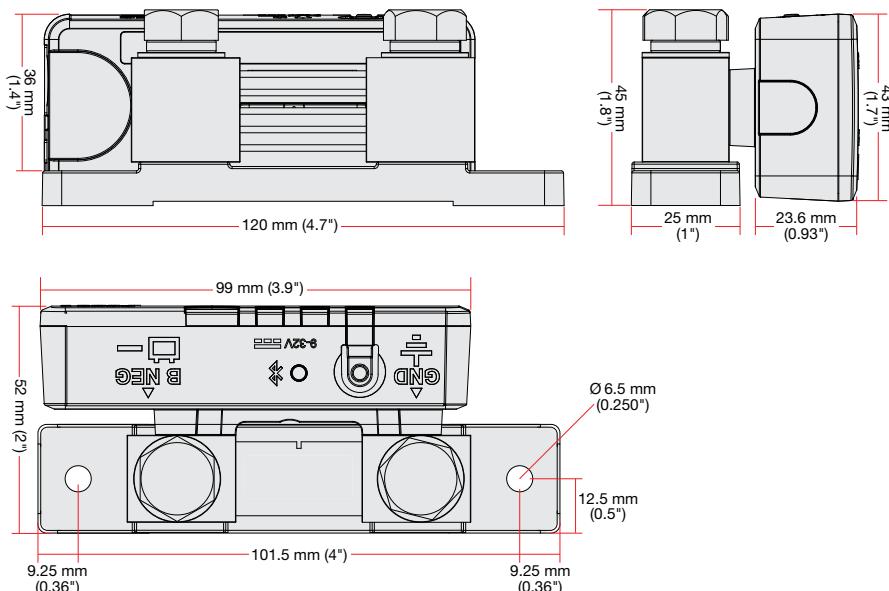
## TEMPERATURE COMPENSATION

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 <sub>4</sub>	40°C < −70 mV / °C < 60°C (104°F < −39 mV / °F < 140°F)

# BATTERY MONITOR SPECIFICATIONS

## GENERAL SPECIFICATIONS

Weight	355g (12.5 oz)
Dimensions	120 × 52 × 45 mm (4.7" × 2" × 1.8")



## ELECTRICAL SPECIFICATIONS

Operating Voltage Range	9–32 VDC ==
Unit Operating Temperature	–20°C to 60°C (–4°F to 140°F)
Power Mode/Device Mode	
Standby	2.4 mA – 3 mA
Normal	12 mA – 18 mA

## OPERATION SPECIFICATIONS

Current Measurement Range	±500 A
Battery Temperature Measurement Range	–40°C to 100°C (–40°F to 212°F)
Battery Type	Standard Lead Acid, Calcium, Gel, AGM, or LiFePO <sub>4</sub> type only

Voltages Specified are ± 100 mV.

## REGULATORY COMPLIANCE

FCC ID	2BAH6-SU601
IC ID	30290-SU601

### Compliance Marks



### Internal Transmission Notice

**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.

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 brouillage est susceptible d'en compromettre le fonctionnement.

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](http://www.redarcelectronics.com/warranty)

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**Europe:** OZPARTS PL sp. z o.o. ul. Słowackiego 32/5 87-100, Torun, Poland

For written request please email [power@redarcelectronics.eu](mailto:power@redarcelectronics.eu)

## CHECKING THE PRODUCT SERIAL NUMBER

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

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