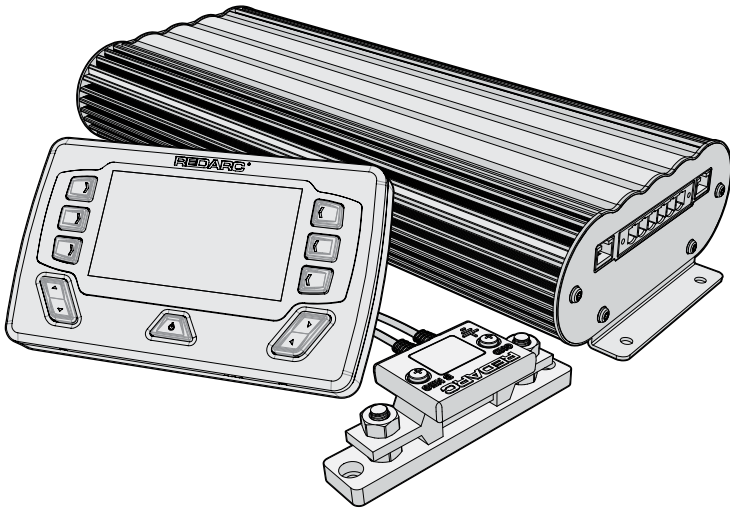


THE POWER OF

**REDARC**®

**THE MANAGER**30

Battery Management System



**BMS1230S3R-NA**



# THE MANAGER30

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The Manager30 Battery Management System is a complete charging solution for your Lead Acid or LiFePO<sub>4</sub> Auxiliary or House battery. The system incorporates 12 V Solar, 110 V AC and 12/24 V DC inputs to provide a 12 V charging output at a maximum 30 A rating. The system also includes a Display which provides information such as current, voltage and temperature as well as a simplified battery percentage and charge rate. This information can also be displayed via the RedVision App on your Smartphone.

## WARNINGS & IMPORTANT SAFETY INSTRUCTIONS

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### SAVE THESE INSTRUCTIONS

**SAVE THESE INSTRUCTIONS — THIS MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS FOR THE MANAGER30 BATTERY MANAGEMENT SYSTEM THAT SHALL BE FOLLOWED DURING INSTALLATION, OPERATION AND MAINTENANCE OF THE UNIT.**

**DO NOT OPERATE THE BATTERY CHARGER UNLESS YOU HAVE READ AND UNDERSTOOD THIS MANUAL AND THE CHARGER IS INSTALLED AS PER THESE INSTALLATION INSTRUCTIONS. REDARC RECOMMENDS THAT THE CHARGER BE INSTALLED BY A SUITABLY QUALIFIED PERSON.**

#### **WARNING**

**RISK OF EXPLOSIVE GASES:**

**WORKING IN THE 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 EACH TIME YOU USE THE CHARGER.**

#### **CAUTION**

1. The Battery Charger 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 Battery Charger.
2. Do NOT alter or disassemble the Battery Charger under any circumstances. All services or repairs 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. Use of an attachment not recommended or sold by REDARC may result in a risk of fire, electric shock, or injury to persons.
4. **GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS** — Charger shall be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug is to be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.  
**DANGER** — Do not alter AC cord or plug provided — where it does not fit outlet, have proper outlet installed by a qualified electrician. Improper connection increases the risk of an electric shock. (If the supply cord is damaged, it must be replaced by the genuine REDARC part or assembly available from the manufacturer or service agent).
5. Cable and fuse sizes are specified by various codes and standards which depend on the type of vehicle the Battery Charger is installed into. Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to the Battery Charger 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 Battery Charger. The fuse must be UL Listed / UL Recognized.
6. When charging a battery, make sure the settings at the Battery Setup menu on the Remote Monitor are correct for the type of battery under charge. Charging a battery with the wrong profile may cause the Battery Charger to indicate a fault or give misleading results and cause injury to persons, damage to the Battery Charger and/or property. Noticeable oscillations between Boost and Absorption stages indicate the wrong choice of battery type. Check and adjust battery type. If you are unsure of the battery type or settings to use, set to the Gel setting.
7. Only use the Battery Charger for charging Standard Automotive Lead Acid, Lead Crystal, Calcium Content, Gel, AGM, SLI, Deep Cycle or Lithium Iron Phosphate type 12 V batteries.

# WARNINGS AND SAFETY INSTRUCTIONS

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8. Do NOT try to charge non-rechargeable batteries.
9. When using the Battery Charger to charge a Lithium Iron Phosphate battery, only batteries that feature an inbuilt battery management system featuring inbuilt under and over voltage protection and cell balancing are suitable.
10. NEVER smoke or allow a spark or flame in vicinity of battery. This may cause the battery to explode.
11. Be extra cautious so as to reduce the risk of dropping a metal tool onto a vehicle battery. Doing so might cause the battery to spark or might short-circuit the battery or other electrical parts that may cause an explosion.
12. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
13. **A SPARK NEAR A BATTERY MAY CAUSE THE BATTERY TO EXPLODE. TO REDUCE THE RISK OF A SPARK NEAR A BATTERY WHEN CONNECTING THE BATTERY INSTALLED IN A VEHICLE TO THE BATTERY CHARGER, ALWAYS DO THE FOLLOWING:**

Always wire the Output Connector before connecting it to the Battery Charger. During connection of the unit, the Battery Output (positive) must be connected first, followed by the Ground (chassis) terminal. The chassis connection should be made away from the battery and fuel lines. DC Input (positive) should be connected last. Once all connections are wired to the Output Connector, plug the connector into the Main Unit.

When disconnecting the Battery Charger, remove the AC Connector first, followed by the CAN connection then the Output Connector from the Main Unit. The DC Input should be disconnected next, followed by the Ground (chassis) connection, then the Battery Output connection if complete removal is necessary.

## 14. PERSONAL SAFETY PRECAUTIONS

To assist with the safe operation and use of the Battery Charger:

- a) Consider having someone close by to come to your aid when you are using the Battery Charger.
- b) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
- c) Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.
- d) 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.
- e) To improve user safety it is recommended to control the charger and monitor the charging process using the remote away from the vicinity of the battery being charged.

### **NOTICE**

1. Do NOT connect computers or IT equipment to the Charger front panel connector or remote. Damage may occur.
2. It is recommended to leave the remote connected at all times to the base unit.
3. The Main Unit must be fixed using suitable screw mounts. Failure to adequately mount the unit, such as using adhesives to mount the unit will result in unreliable operation of the charger.
4. When using the charger in Storage mode, make sure that there is a valid charging source and that all loads are disconnected from the house battery. Failure to do so may cause the house battery to be under charged, give false readings on the State of Charge indicator and possibly cause damage to any loads connected.
5. A partially shaded panel (or low-light conditions such as dawn or dusk) will increase the target solar panel voltage level to match the maximum power point. In this situation solar will be selected as a source however little or no current will be flowing into the battery.
6. Modification of the 'Advanced Settings' menu items affect the way the Battery Charger responds to charging situations. Modification of these settings may result in the Battery Charger not functioning at 100% of its capacity. These settings should only be modified if absolutely necessary and when the effects of the changes are 100% understood.
7. Touring mode will achieve it's best charge level if a Storage mode charge has been recently performed.
8. It is the installers responsibility to ensure their installation complies with any applicable legal and regulatory requirements.

# FCC COMPLIANCE

---

## USA FCC Compliance Notice (CFR §15.105):

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

Any changes or modifications not expressly approved by REDARC could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

## Industry Canada (IC) Compliance Notice (RSS-GEN §8.4):

This device contains licence-exempt transmitter(s)/receiver(s) that comply 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

## IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 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 your body.

**Regulatory and compliance information can also be accessed via the RedVision Display by pressing the Power Button, followed by the Compliances Softkey.**

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## FEATURES AND BENEFITS

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1. The Manager30 incorporates six products in one, it's a DC–DC charger, a 110 VAC Mains/Shore Power charger, a solar charger, a dual battery isolator, a load disconnect controller and a remote battery monitor. The Manager30 will automatically select between charging sources, requiring no input from the operator during its operation.
2. The Manager30 has no fan, which makes it super quiet and very reliable.
3. The Manager30 is designed and manufactured in Australia, for Australian conditions, using the latest electronic and design technologies. It is manufactured with high-quality components to ISO9001 quality and ISO14001 environmental standards and backed with REDARC's quality service and two-year warranty.
4. The Manager30 charging algorithm uses solar whenever possible making the unit more energy efficient and better for the environment.
5. The Manager30's DC–DC charging enables optimal charging of house batteries, even if they have different chemical characteristics from the vehicle battery. The input voltage can be above, equal to or below the output voltage.
6. State of Charge (SoC) indication means you will always know how fully charged the battery is and how much longer it will need to achieve full charge. An easy to operate, high-quality, user friendly graphical display module lets you know what's going on at all times.
7. The Manager30 is very reliable and includes reverse polarity protection (without depending on fuses) and short circuit protection. The unit has undergone stringent safety and electrical compliance testing.
8. The Manager30's easily selectable charging profiles make it suitable for charging all lead-acid battery types and suitably protected LiFePO<sub>4</sub> battery types commonly used in modern travel trailers, motorhomes and Recreational Vehicles (RVs).
9. The Manager30 disconnects automatically from the vehicle battery, so there is always power to start the car.
10. Sophisticated fault detection monitors the house battery condition during all stages of charging, keeping you and your travel trailer/camper/RV safe.
11. The Manager30 has a separate battery sensor to monitor battery conditions and state of charge even while The Manager30 is in standby mode. The battery sensor monitors current, voltage and temperature of the house batteries.
12. Automatic temperature and voltage drop compensation.

# 1 INTRODUCTION

---

## 1.1 General Description

The Manager30 is designed to offer a complete solution to battery charging and maintenance needs for recreational automotive applications.

The Manager30 incorporates AC Mains/Shore Power, DC and Solar inputs to achieve the best charge to a house battery

## 1.2 The Display

The Manager30 comes with a Display designed to give you house battery information and charge status along with critical system information while charging is in progress.

With the Display, you can customize how your house battery is charged and monitor where the charge is coming from, keeping you in control at all times.

The Display can be surface mounted on a wall, or recessed (into the dashboard of an RV for example).

The Display also allows a Bluetooth connection to your Smartphone, via the RedVision App, which provides the same data and control available on the Display all in the palm of your hand.

## 1.3 The Kit Includes

1 Main Unit

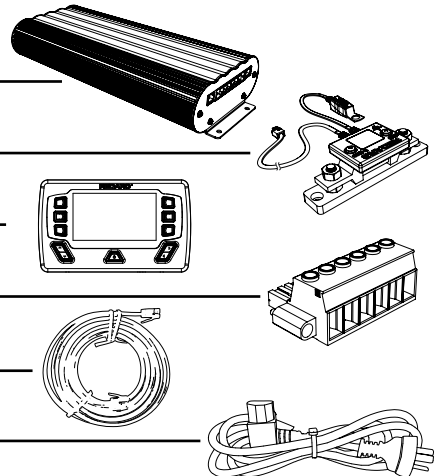
2 Battery Sensor

3 Display

4 Output Connector

5 16'4" (5 m) CANBus Cable

6 Power Cable



# 1 INTRODUCTION

## 1.4 Specifications

### Electrical Specifications

#### Inputs

##### AC Input

Input Voltage Range (nominal)	110 to 120 VAC, 50 to 60 Hz
Power Rating	560 W
Efficiency	80% to 90%
Connection	IEC Mains Plug

##### DC Input

Input Voltage Range	Nominal: 9 to 30 V   Maximum: 9 to 32 V
Turn ON/OFF Threshold 12 V (24 V)	13.2 V / 12.7 V (26.4 V / 25.4 V)
Power Rating	520 W
Efficiency	94%
Connection	Phoenix 1967498 Connector

##### Solar Input

Input Voltage Range	Nominal: 9 to 30 V   Maximum: 9 to 32 V
Turn ON (Open Circuit Voltage)	9.5 V
Power Rating	520 W
Efficiency	93%
Connection	Phoenix 1967498 Connector

#### Output

Total Battery Capacity	40 to 800 Ah
Output Battery Volts (Nominal)	12 V
Output Battery Volts (Minimum)	0.1 V
Output Current	Nominal: 0 to 30 A   Maximum: 0 to 32 A
Maximum Current on Load Disconnect Wire	1 A
Memory Save on Battery Disconnect	Yes

#### Output Protection

Short Circuit Protection	Yes
Surge Protection	Yes
Reverse Polarity Protection	Yes
Overload Protection	Yes

#### Max Volts @ Battery Terminals (77 °F/25 °C Nominal)

	Storage Mode	Touring Mode	Floater
Gel Setting	14.4 V	14.4 V	13.5 V
AGM Setting	14.4 V	14.4 V	13.5 V
Calcium Setting	16.0 V	15.2 V	13.5 V
Standard Lead Acid Setting	15.5 V	14.8 V	13.5 V
Lithium Setting	14.5 V	14.5 V	13.6 V

#### Thermal Specifications

Operating Temperature	-40 °F to 140 °F (-40 °C to 60 °C)
Sealed Lead Acid (SLA), AGM, or Calcium Charging Temperature	-13 °F to 140 °F (-25 °C to 60 °C) (when V <sub>op</sub> > 10.5 V)
SLA, AGM, Gel, Calcium or LiFePO <sub>4</sub> Charging Temperature	32 °F to 140 °F (0 °C to 60 °C)
Over Temperature Shutdown	Yes

#### Temperature Compensation

Standard Lead Acid, AGM, Gel or Calcium Battery	+16.7 mV / °F < 77 °F < -16.7 mV / °F (+30 mV / °C < 25 °C < -30 mV / °C)
Lithium Setting	-40 °F < 0.28% / °F < 140 °F (40 °C < 0.5% / °C < 60 °C)
Over Temperature Shutdown	Yes

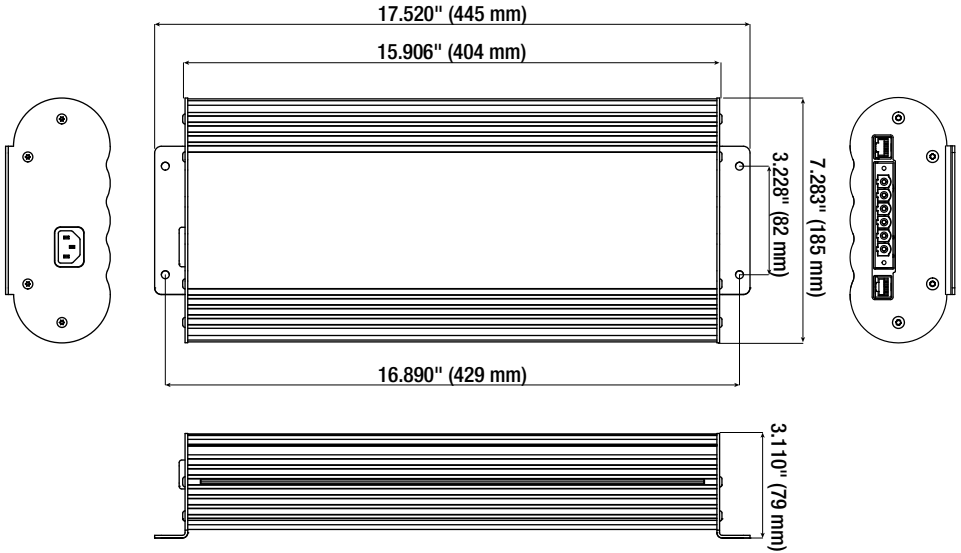
#### Compliance

EMC	FCC, CAN ICES-3 (B)/NMB-3(B)
Safety	UL Listed (Canada, USA)
Environmental	RoHS Compliant

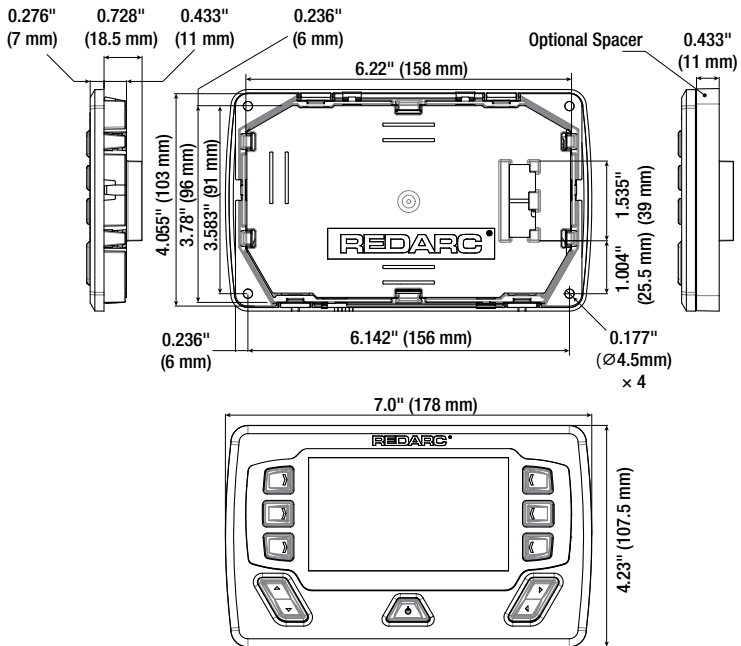
#### General Specifications

Main Unit Dimensions	17.5" × 7.3" × 3.1" (445 × 185 × 79 mm)
Display Dimensions	7.0" × 4.2" × 1.0" (178 × 107.5 × 25.5 mm)
Kit Weight	12.1 lbs (5.5 kg)
Warranty	2 years





**FIGURE 1.4.1: Main Unit Dimensions**



**FIGURE 1.4.2: Display Dimensions**

## 1.5 Multi-stage Charging Process

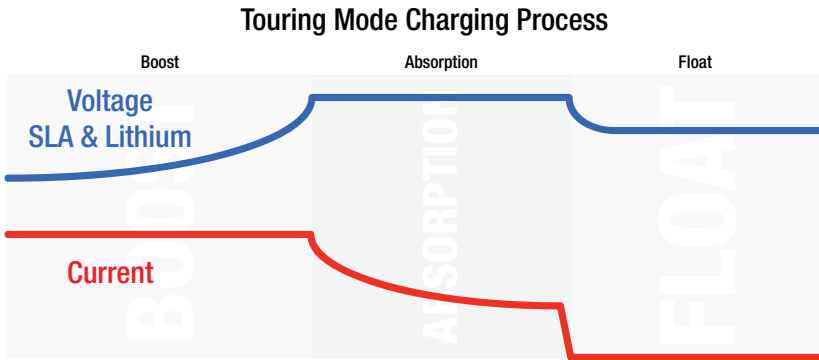
The Manager30 incorporates two different multi-stage charging profiles – Touring (3-stage) and Storage (8-stage) – which can be selected in the System Mode menu (outlined in section 3.4 on page 30 of this manual) on the Display.

### Touring Mode

Touring mode is designed for use when ‘on the road’. Touring mode offers a 3-stage charging profile consisting of Boost, Absorption and Float stages (see Figure 1.5.1). In Touring mode, the house battery is monitored to detect only a limited number of faults such as short circuit, over current and over voltage. This allows The Manager30 to operate correctly even when loads are connected to the house battery. This mode will always produce an output (unless a fault condition is detected) and will cycle through the three stages as required to maintain the house battery as outlined in Figure 1.5.1.

#### **NOTICE**

Touring mode will achieve its best charge level if a Storage mode charge has been recently performed.



**FIGURE 1.5.1:** Mode Charging Process

## Storage Mode

Storage mode is designed to charge the house battery to its optimal level and maintain that level while your travel trailer or RV is in storage. This mode requires a valid charging source (110 V or solar and all loads to be switched off or disconnected from the house battery before charging. It uses a 8-stage\* charging profile consisting of Desulphation\*, Soft Start, Boost, Absorption, Battery Test, Equalize\*\*, Float and Maintenance stages (see Figure 1.5.2). Storage mode is designed to detect a wide range of battery fault conditions, for more information on these fault conditions, please refer to section 3.6 'Fault Display'.

Unlike Touring mode, Storage mode does not cycle through the entire charge process. When the charging process is completed, The Manager30 will always remain in either Float or Maintenance stages. Float stage will provide the house battery with a 'trickle' charge whenever the house battery voltage drops below a predetermined threshold to ensure the battery stays charged. Maintenance stage turns The Manager30 output off, but continues to monitor the House Battery and will revert to Float stage when the House Battery drops below 12.7 V (12.8 V for Lithium) for 5 seconds or below 90% SoC for 1 hour.

**NOTE:** If The Manager30 is set to Storage mode and the vehicle is started The Manager30 will automatically switch to Touring mode once it senses an increase in input voltage from the alternator.

### NOTICE

When using the charger in Storage mode, make sure that there is a valid charging source and that all loads are disconnected from the house battery. Failure to do so may cause the house battery to be under charged, give false readings on the State of Charge indicator and possibly cause damage to any loads connected.

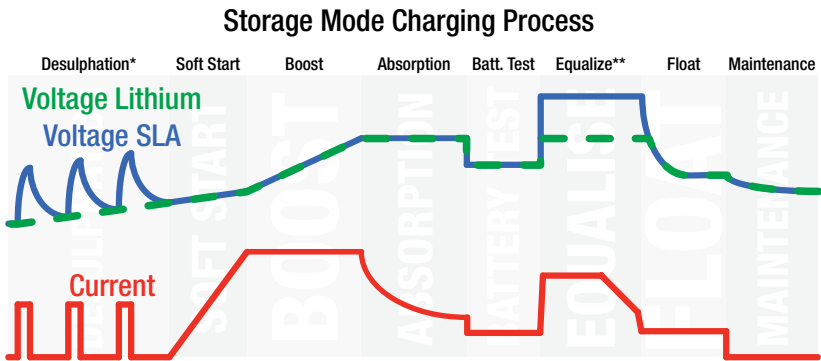


FIGURE 1.5.2: Storage Mode Charging Process

\*The Lithium profile does NOT incorporate a Desulphation stage.

\*\*The Lithium, AGM and Gel profiles do NOT incorporate an Equalize stage

# 1 INTRODUCTION

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## IMPORTANT


When The Manager30 is set to 'Storage' mode and no valid charging sources are connected, it will enter a 'Sleep' mode 30 seconds after the last user interaction. The sleep mode is designed to limit the amount of current drawn from the output battery by the system whilst in Storage mode and does this by switching the screen and all non-essential functions off. The Manager30 will 'wake-up' from its Sleep mode if the power button is pushed or if any valid input source is sensed, though this may take 30-60 seconds to occur after the source is connected.

## 1.6 Maximum Charge Current Setting

The Manager30 allows the user to set the maximum charge current for their battery, making it suitable for charging batteries as small as 40 Ah in capacity. When the charge current is set below the maximum 30 Amps, the current supplied to charge the battery is restricted to the user setting. Any excess BMS1230S3 capacity is available to power loads running from the battery under charge.

If no loads are running from the battery, total current from The Manager30 will be restricted to the level set by the user.

## 1.7 Recommended batteries

Because of the rapidly changing nature of batteries and battery technology, REDARC avoid recommending specific battery makes or models. Instead, we recommend consultation with a battery specialist, and that the batteries used be  UL approved where possible.

Regardless of the battery(s) chosen, check the manufacturer's datasheet to ensure maximum charge current and maximum charge voltage does not exceed the battery's ratings.

## 1.8 Green Power Priority

The Manager30 is designed to charge from multiple sources simultaneously to charge the auxiliary/house battery. If the Solar power input is available the maximum available solar power will be used before topping up the output charging current from another source if available (e.g. AC Mains/Shore Power). Priority is given to Solar then to AC Mains power, then to DC Vehicle power.

### 2.1 System Layout

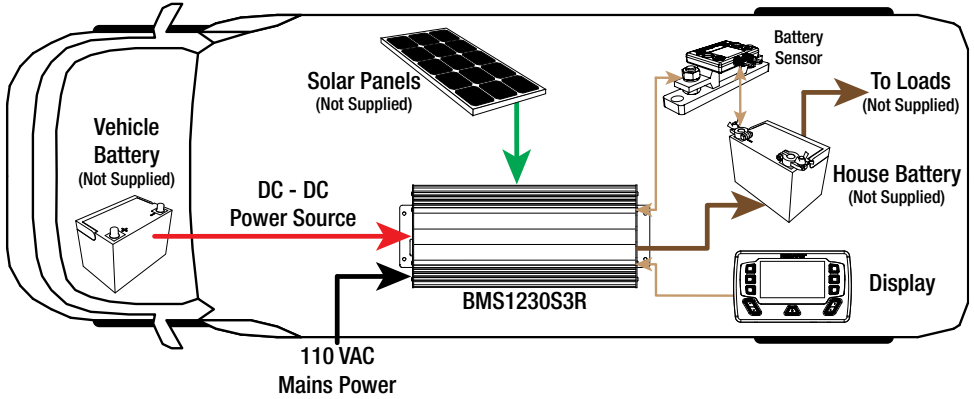
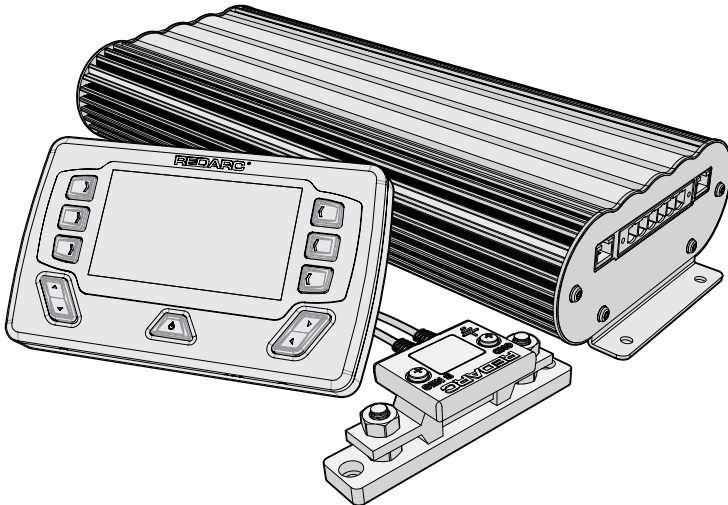


FIGURE 2.1.1: System Layout

### 2.2 Mounting Instructions

This section describes how to mount the three major components of The Manager30: the Main Unit, the Display and the Battery Sensor.

FIGURE 2.2.1: The Manager30 System



### 2.2.1 Mounting the Main Unit

Do NOT expose the Main Unit to rain, snow, spray or bilge water. For optimum operation, The Manager30 should be mounted where the temperature is nominally below 95 °F (35 °C) and does not exceed a maximum of 140 °F (60 °C). The Main Unit must not be mounted in the engine bay and it is not suitable for charging any battery at engine bay temperatures.

The Main Unit must not be installed in a location with any less than 4" (100 mm) clearance at the top of the Main Unit, to allow for airflow across the heatsink fins.

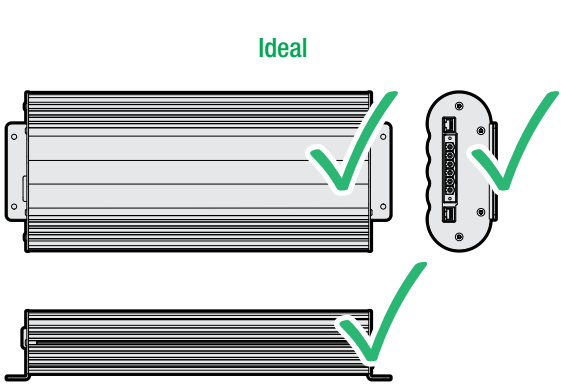
The Main Unit and Battery Sensor should be installed as close as practicable to the house battery. The cable length should be less than 6 ½ feet (2 m).

The Main Unit must be mounted to a flat, solid support using ¼" (M6) sized screws or bolts, using all four mounting holes.

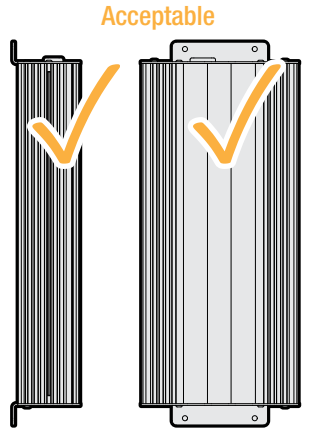
**NOTICE**

The Main Unit must be fixed using suitable screw mounts. Failure to adequately mount the unit, such as using adhesives to mount the unit will result in unreliable operation of the charger.

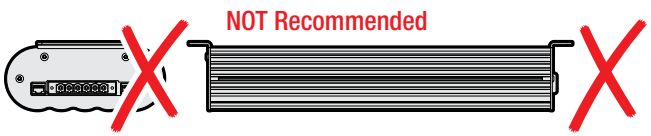
REDARC recommends that the Main Unit be mounted to optimize airflow past the heatsink. Mounting the unit horizontally (see Figure 2.2.1.1) is recommended and mounting vertically (see Figure 2.2.1.2) is still acceptable. Do NOT mount the unit as shown in Figure 2.2.1.3.



**FIGURE 2.2.1.1:** Horizontal mounting is recommended



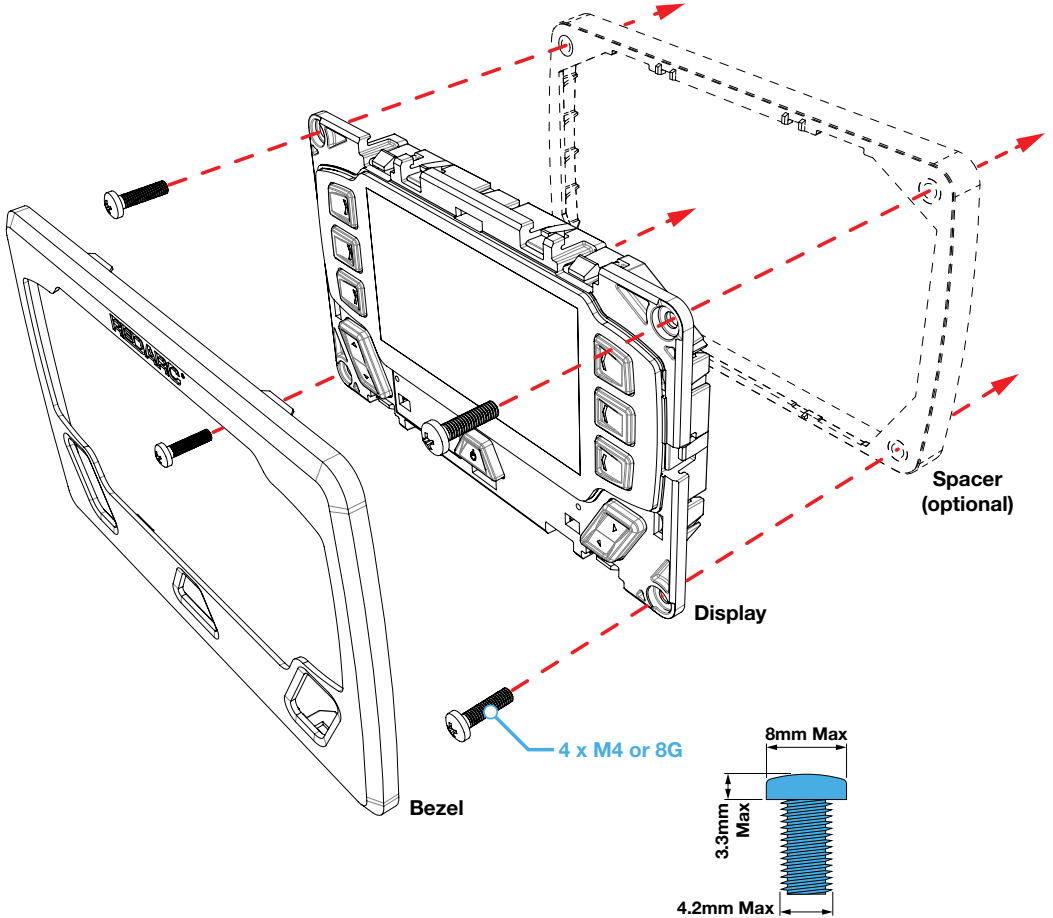
**FIGURE 2.2.1.2:** Vertical mounting is acceptable



**FIGURE 2.2.1.3:** Do NOT mount the unit upside down

### 2.2.2 Mounting the Display

The Display should be mounted inside the vehicle (Refer to page 38 for a 1:1 cutout template). It is however acceptable to mount the Display in any convenient location, as long as it is protected from harsh environments such as being exposed to rain or severe amounts of dust or full-time direct sunlight.

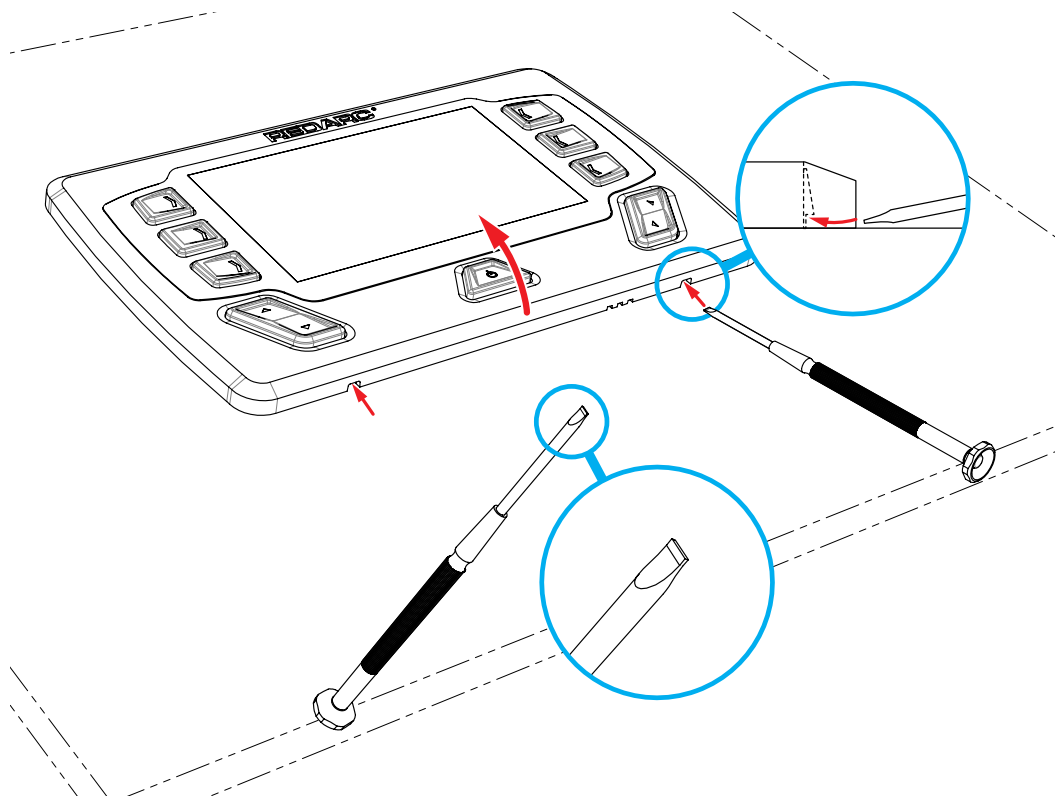


#### **CAUTION**

Ensure that the Display is not mounted in vehicle head-impact zones. Doing so may result in injury to the driver and/or passenger in the event of an accident.

Ensure the Display is not mounted where it may distract the driver of the vehicle. Distracting the driver may result in an accident.

### Removing the Display Fascia

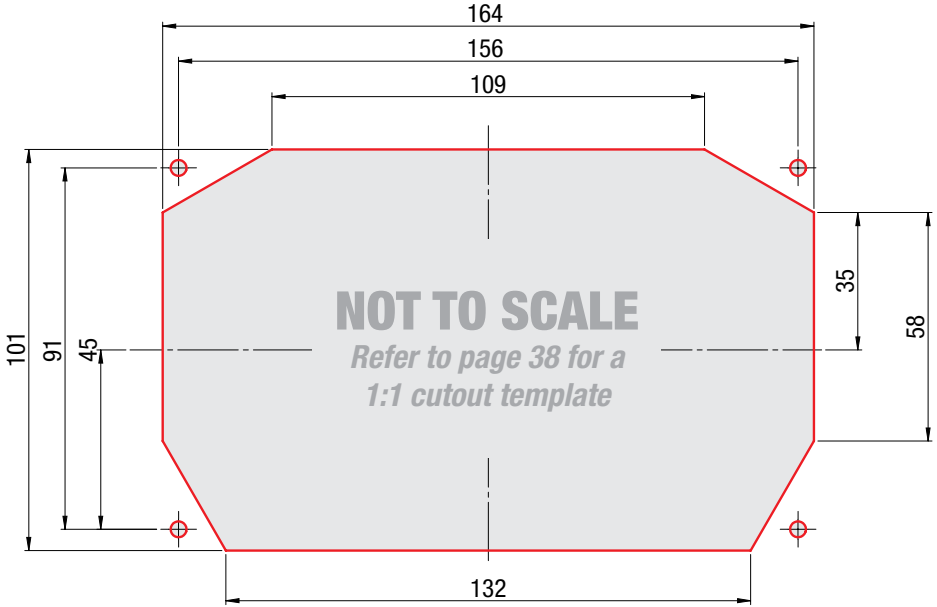




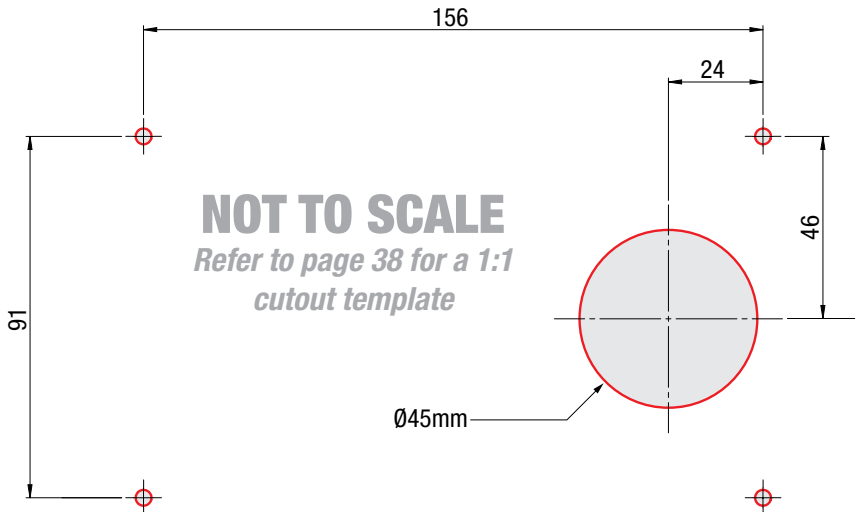
### NOTICE

Refer to page 38 for a 1:1 cutout template

### Flush Mount Drill/Cut Dimensions



### Surface Mount Drill/Cut Dimensions

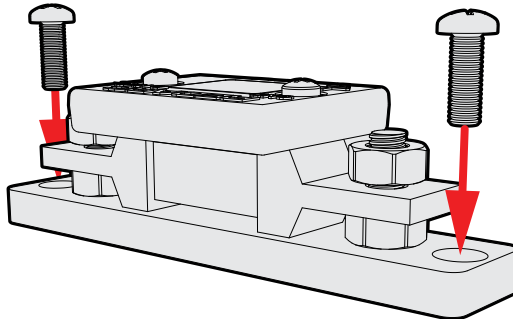


### 2.2.3 Mounting the Battery Sensor

The length of cables on the Battery Sensor to connect to the Main Unit and the House Battery will dictate the allowable mounting distance from the battery however REDARC recommend mounting the Battery Sensor as close to the House Battery as possible.

The sensor must be mounted where the red temperature/voltage sensor module can be bolted to the battery positive terminal of the House Battery.

The Battery Sensor should be mounted to a solid surface using two suitably sized screws for attachment. Figure 2.2.3.1 illustrates how to mount the Battery Sensor.



**FIGURE 2.2.3.1:** Mounting the Battery Sensor

## 2.3 DC Cable Size Requirements

### **⚠ CAUTION**

Cable and fuse sizes are specified by various codes and standards which depend on the type of vehicle the Battery Charger is installed into. Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to The Manager30 or other equipment installed in the system. The installer is responsible for ensuring that the correct cable and fuse sizes are used when installing the Battery Charger.

The Manager30 is capable of drawing up to 50 A from the Vehicle Battery (which may be several feet/meters from its installation location) and is limited to 30 A output to the House Battery. The installer needs to ensure the appropriate cable is used to connect the positive and negative connections of The Manager30 to both the Vehicle Battery and the House Battery. The Manager30 will operate with less efficient cabling however for best performance, high-quality cable connections should be used to minimize voltage drop and efficiency losses.

**2.3.1 Input Wire Diameter Selection**

REDARC recommends the installer use cabling and connections between 8B&S and 6B&S automotive. REDARC recommends that the input wire be of the size outlined in Figure 2.3.1.1.

Distance from input vehicle battery to The Manager30	Recommended Cross Sectional Area (mm <sup>2</sup> )	Recommended Diameter Equivalent
≤ 10' (3 m)	8	8AWG / 8B&S
> 10' (3 m)	13	6AWG / 6B&S

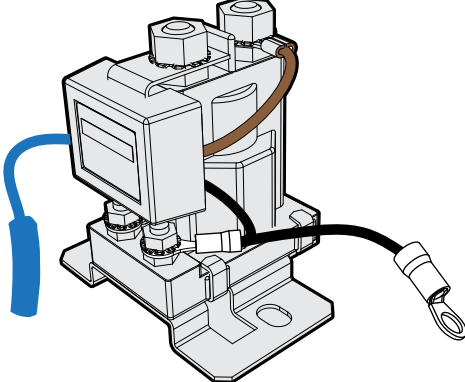
**FIGURE 2.3.1.1:** Recommended input cable size

**2.3.2 Output Wire Diameter Selection**

REDARC recommends the installer use cabling and connections between 8B&S and 6B&S automotive. REDARC recommends that the output wire be of the size outlined in Figure 2.3.2.1. For longer runs, using 10 mm<sup>2</sup> is recommended, however this will lower efficiency by up to 3% (the recommended maximum length is 16'5" (5 m)).

Distance from The Manager30 to House battery	Recommended Cross Sectional Area (mm <sup>2</sup> )	Recommended Diameter Equivalent
≤ 5' (1.5 m)	8	8AWG / 8B&S
> 5' (1.5 m)	13	6AWG / 6B&S

**FIGURE 2.3.2.1:** Recommended output cable size



REDARC recommend using the SBI12-BLD as the 12 V relay for setting up the Load Disconnect Feature for nonessential Loads.

Similarly, the SBI12-LLD is recommended for use between the Auxiliary/House battery and the Essential Loads in a Lithium Battery setup, to protect the Lithium battery from excessive discharge.

### 2.4 The Manager30 Wiring Connections

#### WARNING

REDARC recommends that this unit be installed by a suitably qualified person.

#### CAUTION

The AC/Shore Power connection must be connected to an earthed socket outlet. Do not use The Manager30 AC input if the cord is damaged. Use of a non-genuine or damaged AC input cord may result in a risk of fire, electric shock, or injury to persons. (If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or service agent).

#### CAUTION

Always wire the Output Connector before connecting it to the Main Unit. During connection of the unit, the Battery Output (positive) must be connected first, followed by the Ground (chassis) terminal. The chassis connection should be made away from the battery and fuel lines. DC Input (positive) should be connected last. Once all connections are wired to the Output Connector, plug the connector into the Main Unit.

When disconnecting remove the Output Connector from the Main Unit first. The DC Input should be disconnected next, followed by the Ground (chassis) connection, then the Battery Output connection.

#### 2.4.1 Load Disconnect Feature

The Load Disconnect wire is a ground switch to activate a relay for disconnection of any loads running from the house battery. The relay must be 12 V with a maximum coil current of 1 A and resistor or diode suppression is recommended. The Load Disconnect feature must be activated in the User Menu as explained in Section 3.5 of this manual.

#### 2.4.2 Ignition Trigger Feature

The Ignition Trigger wire is used to turn the DC charging source on with ignition. In most circumstances this wire does not need to be connected. This feature is designed to allow vehicle with Variable Voltage alternators to trigger the DC Input. Figure 2.4.4.2 shows how to wire the Ignition Trigger wire.

The Ignition Trigger feature must be activated in the User Menu as explained in Section 3.5 of this manual.

### 2.4.3 Connecting the Battery Sensor

Wire the Battery Sensor as shown in Figure 2.4.3.1 ensuring that the “BNEG” stud connects to the House Battery negative terminal and the “GND” stud connects to the vehicle common ground point. The Battery Positive Lead connects to the house battery positive terminal, this lead measures voltage and temperature at the battery. Connect the CANBus Connection cable to either of the main unit CANBUS interfaces.

**NOTE:** When securing the cables to either side of the shunt using the provided nut, ensure the head of the bolt is also held by a spanner, to prevent twisting and damage to the shunt. Do not over tighten.

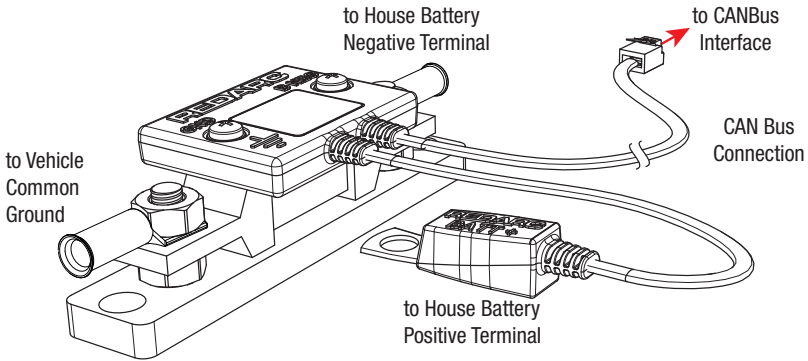


FIGURE 2.4.3.1: Battery Sensor connections

### 2.4.4 Wiring the Main Unit

Refer to Figure 2.4.4.1 for required connections and to Figure 2.4.4.2 typical setup.

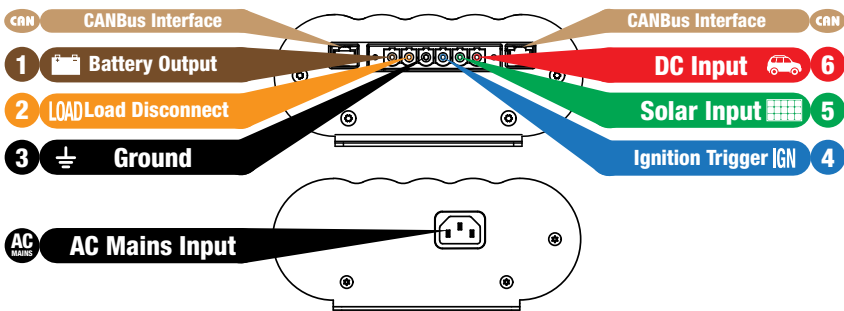


FIGURE 2.4.4.1: Required connections

**NOTE:** If a longer Display cable is required, a replacement CAT5 patch cable may be used, up to a length of 32' (10 m).

**Typical Setup**

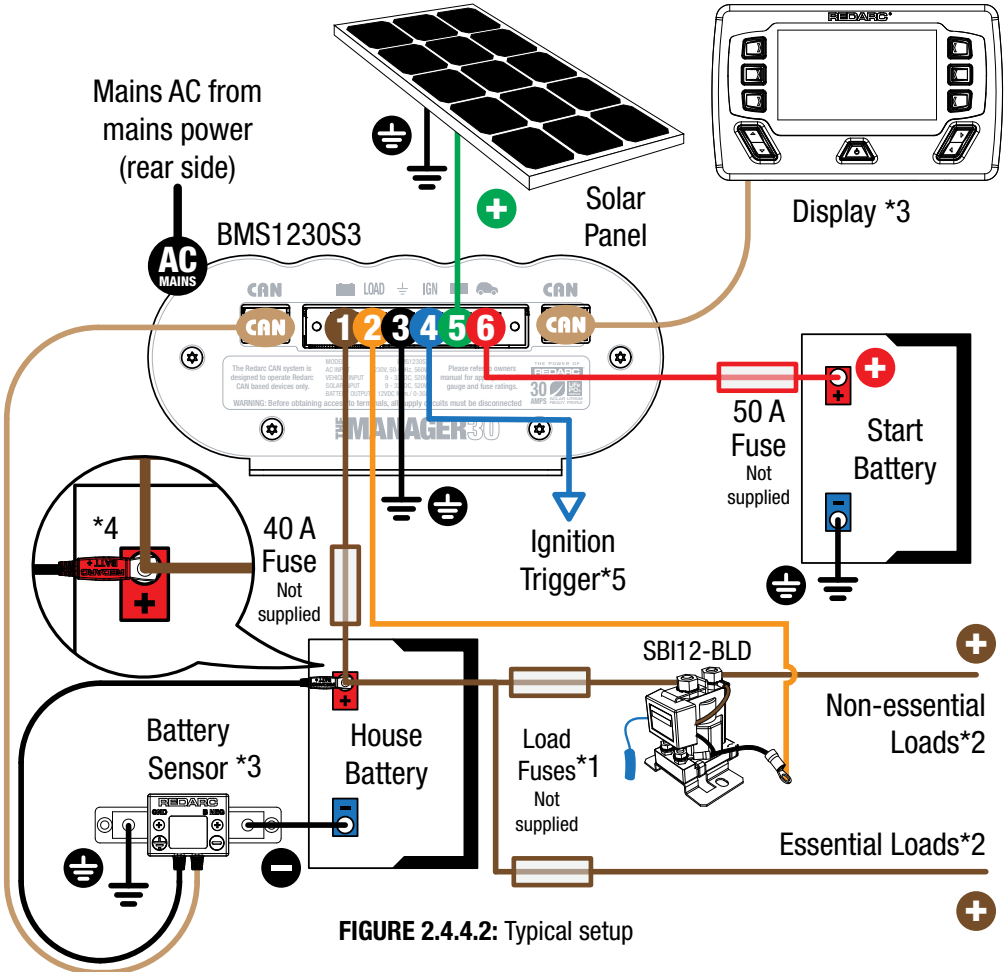
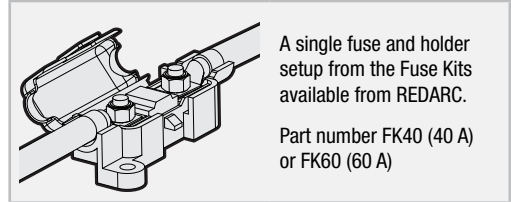
\*1 The size of this fuse relates to the total current draw of all the loads connected to the House Battery, and should be rated slightly higher than this. REDARC recommend the use of MIDI Style Fuses.

\*2 Essential loads are loads which must be left on at all times, until the battery is flat. Non-essential loads are those switched off when the battery reaches a particular low-charge level, which can be set in the 'Advanced Settings' menu.

\*3 Both CANBus connections can be used for either the Display or Battery Sensor

\*4 Ensure the RED terminal on the Battery Sensor is connected to the Battery Positive Terminal.

\*5 For vehicle ignition connection, connect to the ignition switched fuse in either the engine bay or internal fuse box for the radio.



**FIGURE 2.4.4.2: Typical setup**

### 2.5 Batteries

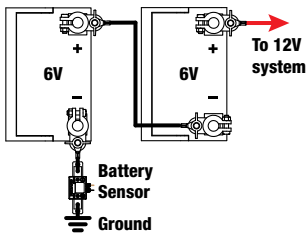
#### **! WARNING**

Working in the 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 each time you use the charger.

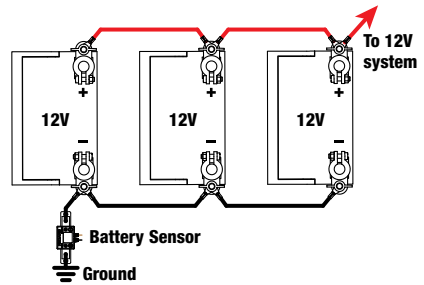
#### **! CAUTION**

When charging a battery, make sure the settings at the Battery Setup menu on the Display are correct for the type of battery under charge. Charging a battery with the wrong profile may cause The Manager30 to indicate a fault or give misleading results and could result in damage to the battery. Noticeable oscillations between Boost and Absorption stages indicate the wrong choice of battery type. Check and adjust battery type. If you are unsure of the battery type or settings to use, set The Manager30 to the Gel setting.

Figure 2.5.1 and 2.5.2 show standard wiring for batteries in series and in parallel.



**FIGURE 2.5.1:** Batteries in series



**FIGURE 2.5.2:** Batteries in parallel

To ensure that all batteries are equally charged, loads and The Manager30 should be connected with ground and 12 V power connected diagonally opposite across all batteries as shown in Figure 2.5.2.

The Ah rating needs to be setup when prompted on first start up, these settings can also be modified in the “BMS Settings” menu (Refer Section 3.5).

To identify the Ah rating of batteries in parallel, add the rating of each battery in the bank together. For example, 3 batteries with an Ah rating of 100 Ah each will yield a total rating of  $3 \times 100$  Ah or 300 Ah.

Batteries connected in series will assume the Ah rating of the battery with the lowest Ah rating. For example, if one battery is 50 Ah and the other is 100 Ah, the Ah rating for the series is 50 Ah.

**Note:** It is strongly recommended that house batteries connected in series be the same type and capacity.

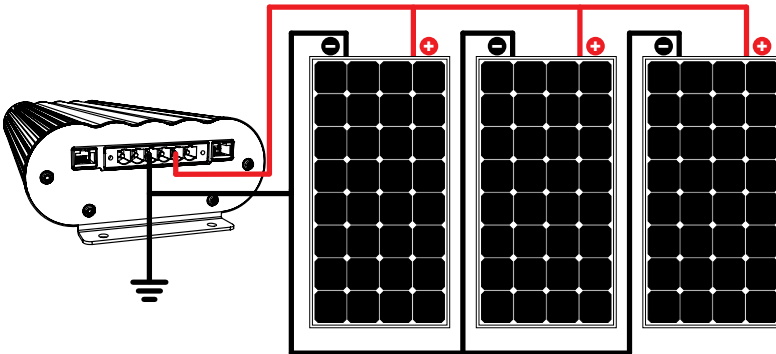
### 2.6 MPPT Solar Regulator

The Manager30 is designed for use with 12 V solar panels. A minimum input voltage of 9.5 V is required to start charging from a solar source. Once charging has started, the operating voltage range of the solar input can go as low as 9 V and as high as 32 V; outside of this range, charging will stop.

The power output from solar panels varies depending on the amount of sunlight and the electrical load on the solar panel output. The Manager30 utilizes a Maximum Power Point Tracking (MPPT) algorithm on the solar input, to ensure that the greatest charge possible is transferred from the solar panels to the battery under charge. As conditions change, the MPPT algorithm adjusts its parameters accordingly, in order to maintain the optimum point at which the solar panels can deliver the most power.

An array of solar panels can be connected to The Manager30 solar input, on the condition that the open circuit output voltage of the array is at least 9.5 V and does not exceed 32 V\*. For this reason, 12 V panels must be connected in parallel (Refer to Figure 2.6.1). So long as the voltage requirements are met, there is no limit to the number of panels that can be connected in a solar array; however The Manager30 will not draw more than 520 W from the solar input.

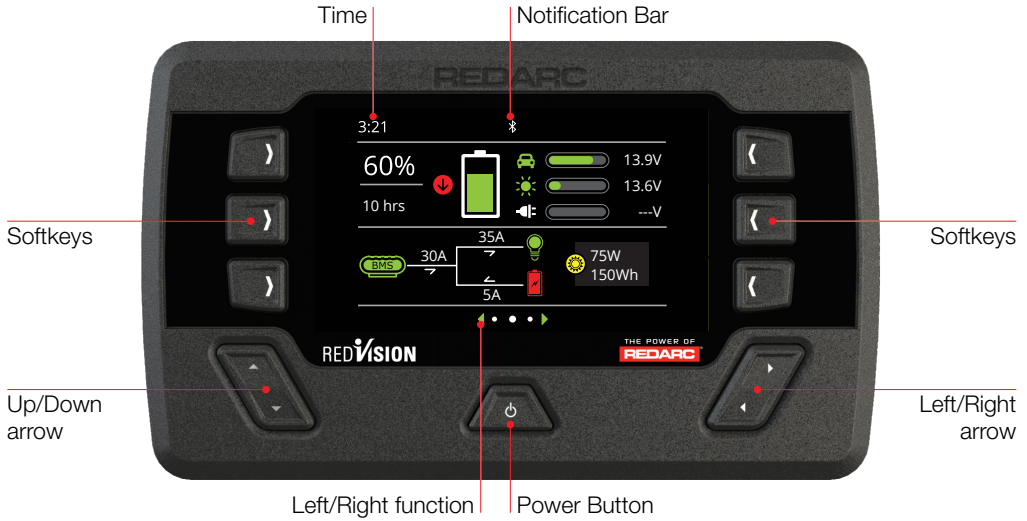
For installations with a single 12 V solar panel, a blocking diode is not necessary. For installations with an array of solar panels, please refer to the panel manufacturer's instructions for requirement and/or fitment of diodes.



**FIGURE 2.6.1:** Array of 12 V Solar Panels



## 3.1 The Display



The Display is the main user interface for the Manager30 System. The Display is designed to give you control of how the battery is being charged, as well as up-to-date house battery and charge information at any time during the charging process. You can check battery charge status, estimated charge time and State of Charge (SoC) per hour over a day and per day over a month. It also allows you to select charging profiles specific to the battery type and size. It also provides the Bluetooth® interface for the RedVision App.

With a RedVision Distribution Box connected, the Display allows control of an Inverter and up to 10 outputs along with information from 2x temperature and 6x water level sensors, bringing information and control to one place without the need for multiple displays and control panels.

### **NOTICE**

Do not use chemicals or cleaning products as damage to the unit may occur.

Clean using a slightly damp cloth only.

## Navigation

The Left/Right buttons are used to navigate the pages on the center of the screen.

The Up/Down buttons are used to navigate through options found on other pages or to cycle through devices on the Home Page when a Distribution Box is connected.

The Left/Right and Up/Down functions are indicated on the screen.

## Soft Keys

The Soft Keys functions will be indicated by an icon and these functions will change depending on the screen.

## Power Button Function



Push

Pushing the Power Button ONCE will open a Power Button instruction dialogue and allow switching between Storage and Touring modes.



Push 2 ×

Pushing the Power Button TWICE will invoke the 'Master Switch' function, when a Distribution Box is installed.







This function switches a defined set of devices and can be customized, by the installer, to user specifications.



Hold

HOLDING the Power Button will put the screen into Standby mode. Pushing any button will wake the screen up again. When the system is set to 'Storage Mode' only the Power Button will wake the display up.

## Notification Bar

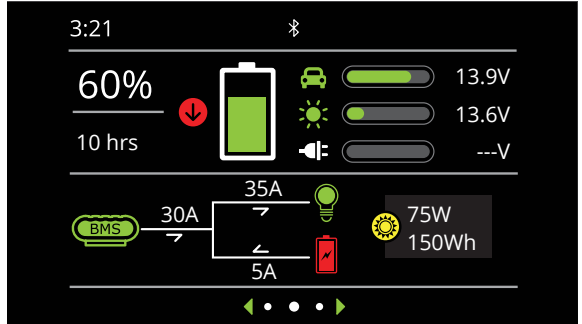
- |   |   |
|---|---|
|  Bluetooth® Connected  |  Load Disconnect Invoked |
|  Master Switch Invoked |  Storage Mode Selected   |
|  Fault Indication      |  Alarm Notification      |

## 3.2 Basic Screens

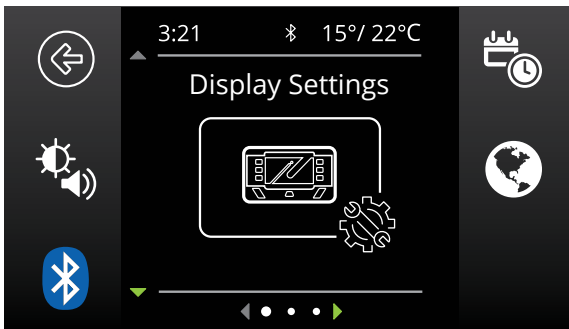
### Home Screen

When connected to a Manager only, the RedVision display will provide real time information on the battery State of Charge, Sources, Current Flow and Solar Input<sup>\*1</sup>.

Pushing Left reveals the Settings menu and Right reveals the information menu.



<sup>\*1</sup> The information provided on the home screen may vary depending on the system



### System Settings

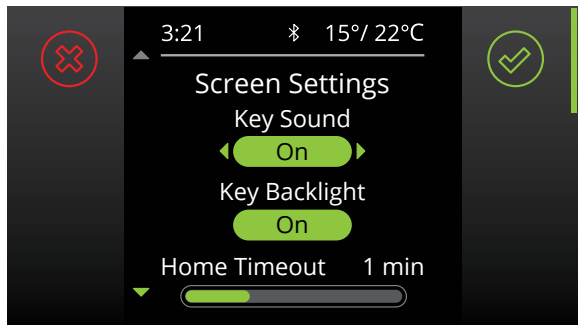
This menu allows the user to change Display, System, BMS and Distribution Box settings (if fitted), selected by Soft Key.

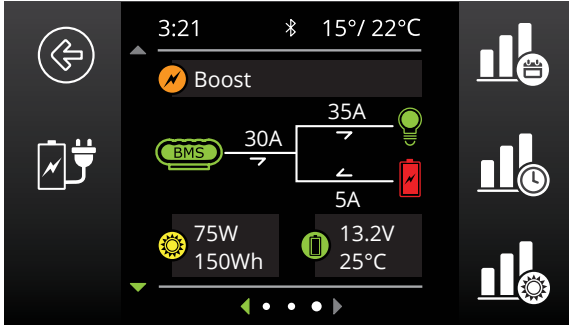
Pushing the Up/Down arrows cycle through the available settings menus. Pushing the top left 'Back' Soft Key will return the user back to the Home Screen.

### Changing Settings

Once the desired Settings Screen is selected using the Soft Keys, the available settings can be modified. Pushing the Up/Down arrows will cycle through the settings. Pushing the Left/Right arrows will modify the setting.

The 'Green Tick' Soft Key will save the adjustment, the 'Red Cross' Soft Key will cancel the changes.





## BMS Information

The BMS information screen provides information on charge stage, current flow, State of Charge (SoC), solar input and battery status<sup>2</sup>.

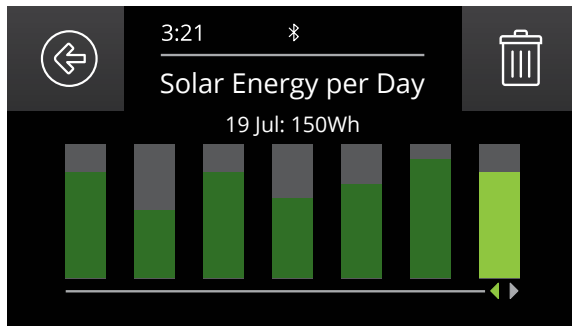
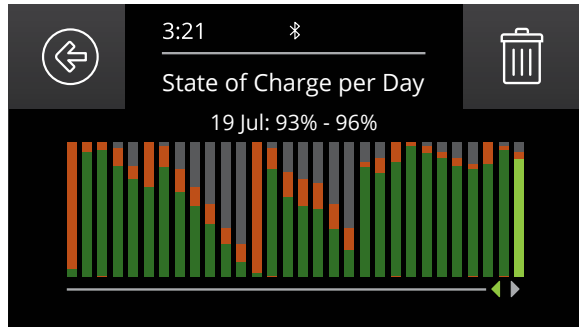
The Soft Keys on the right link to performance logs for SoC/Day, SoC/Hour and Solar Power input. The Soft Key on the left links to the Charging Source information page. Pushing the down arrow displays the Distribution Box Info. screen<sup>3</sup>.

<sup>2</sup> When used with a REDARC MANAGER system.

<sup>3</sup> When used with a REDARC RedVision Distribution Box.

## State of Charge logs

The State of Charge log screens detail either the SoC on the hour for the previous 24 hours (State of Charge per Hour) or the maximum and minimum SoC each day for the previous 30 days. Pushing the Left and Right buttons at this screen will cycle through the logs, displaying the information at the top of the graph.

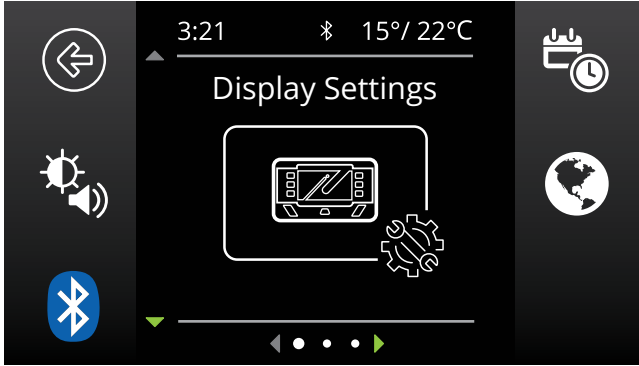


## Solar Power input log

The Solar Power input log keeps track of the Solar Power generated per day for the previous 7 days.

Pushing the Left and Right buttons at this screen will cycle through the logs, displaying the information at the top of the graph.

### 3.3 Display Settings



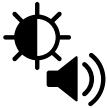
#### Factory Settings

Key Sound:	ON
Key Backlight:	ON
Home Timeout:	1 min
Standby Timeout:	1 min
Brightness Minimum:	20%
Brightness Maximum:	100%
Clock Format:	12 Hour

The Display Settings screen allows setup and modification of Display specific settings as outlined below.



This icon will return to the Home Screen.



This icon links to the Screen Settings menu. This menu allows switching of Key Sounds and Backlight and modification of Screen Timeouts and Minimum and Maximum Screen Brightness levels.



This icon links to the Bluetooth® pairing screen. This screen allows connection of the Display to a standalone device via Bluetooth®. This process is explained further in Section 3.7.

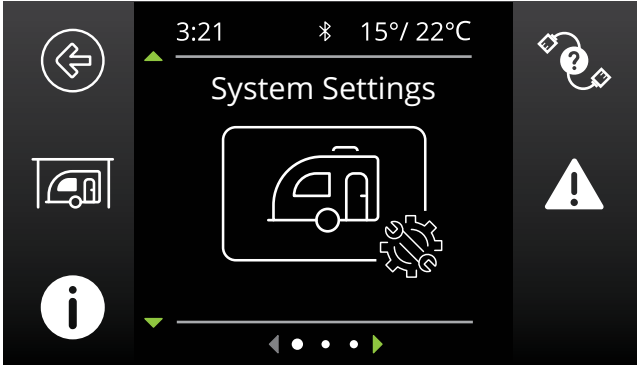


This icon links to the Date and Time settings screen. The user is prompted to enter date and time upon first startup however should this need to be changed, it can be done in this menu.



This icon links to the Regional Settings menu. This menu allows toggle of the Clock format between 12 and 24 hour formats and the Temperature units between Celsius and Fahrenheit.

#### 3.4 System Settings



The System Settings screen allows modification of the current operating mode as well as providing information on the system and previous fault history. Each icon is described below.



This icon will return to the Home Screen.



This icon links to the System Mode menu. This menu allows switching of the System Mode between Storage and Touring. Storage Mode will switch off all loads and set the Manager into Storage Mode should one be connected.



This icon links to the About Us screen. This screen provides contact information for REDARC.

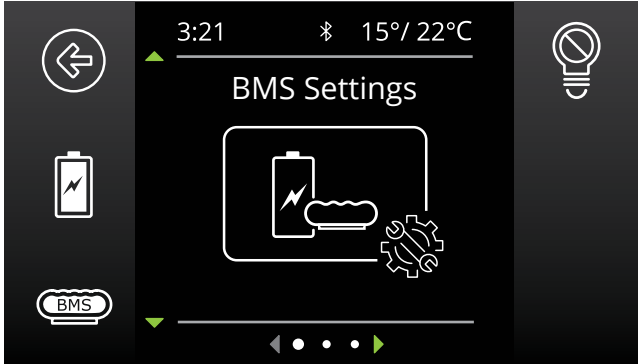


This icon links to the RBus Diagnostics screen. This screen provides a serial number for each REDARC device connected to the system. More information on the selected device can be found by clicking the top right Soft Key.



This icon links to the Fault History screen. This screen provides a list of the 10 most recent faults. Clicking the top right Soft Key will provide more information on the selected fault.

#### 3.5 BMS Settings



When a Battery Management System is connected, the system will allow setup and modification of a number of BMS settings as outlined below.



This icon will return to the Home Screen



This icon links to the Battery Information screen. This screen allows the user to set their battery type and size. This information is critical for the operation of the Manager product so it is important to ensure this is correct



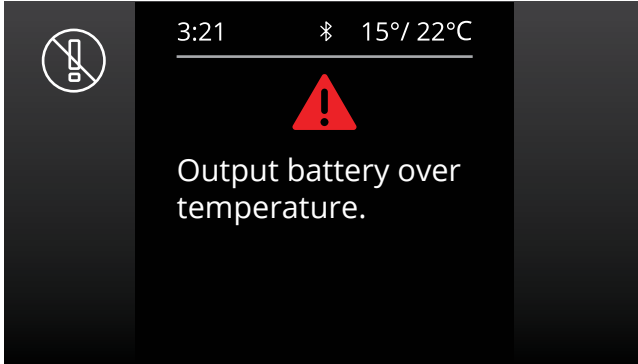
This icon links to the Charger Settings screen. This screen allows setting of the DC input trigger on the Manager and allows modification of the Low Voltage and SoC alarm levels.



This icon links to the BMS Load Disconnect screen. This allows for setting of the Load Disconnect feature on the Manager.

**NOTE:** This feature operates similarly but independently to the Distribution Box Load Disconnect feature.

### 3.6 Fault Display



If The Manager30 detects a problem with the charging system that prevents it from continuing to charge the battery, it will alert you via a 'Fault' screen and an alarm buzzer, and will instantly terminate the charging cycle until the fault condition is cleared. The screen will give a brief description of the problem and allow you to select either 'Clear' or 'Ignore'. Both options will clear the screen. After selecting 'Clear', however, The Manager30 will immediately check to see if the condition still exists. If it doesn't, the unit will restart charging. Selecting 'Ignore' will simply hide the fault screen for up to one minute. It will NOT allow The Manager30 to recommence charging unless The Manager30 itself detects the removal of the fault condition.

If The Manager30 detects a problem with the charging system that does not prevent it from charging the battery, it will alert you via a Warning screen and an alarm buzzer, and continue charging. The screen will give a brief description of the problem and allow you to select either 'Clear' or 'Ignore'. Both options will clear the warning screen. After selecting 'Clear', however, The Manager30 will immediately check to see if the fault condition still exists. If it does, it will display the warning screen again. Selecting 'Ignore' will prevent The Manager30 from detecting the same fault for up to one minute.

**NOTE:** If "Ignore" is selected but the fault is not removed, when the warning re-appears after one minute, it will not be accompanied by the alarm buzzer.

See page 33 for a description of faults and warnings that can be detected by the Manager30.

If a Distribution Box is connected the system can also detect faults with fusing, switching and various connected devices.



## Faults

CHARGER FAULT MESSAGE	CAUSE	ACTION
Charger over current fault	An internal error has caused excessive current draw	Return to supplier
Charger over voltage fault	The output voltage is too high (above 18 V)	Check battery is correct type (12 V, 6 cell)
Charger over temperature. Allow to cool	The unit has over heated	Allow to cool, charging will recommence automatically
Output battery under temperature fault	Output battery is below the minimum charging temperature	Charger will halt charging until battery temperature has increased above the minimum charging temperature
Output battery over temperature fault	Output battery is above 140 °F (60 °C)	Charger will halt charging until battery is below 131 °F (55 °C)
Dry cell detected in output battery	Charger has detected a dry cell in output battery	Replace battery
Shorted cell detected in output battery	Charger has detected a shorted cell in output battery	Replace battery

## Warnings

CHARGER WARNING MESSAGE	CAUSE	ACTION
AC supply over voltage	The internal AC converter output voltage is too high	Contact supplier
AC supply over temperature.	The internal AC converter temperature is too high	Allow to cool If problem persists, contact supplier
DC supply over voltage	The DC input voltage is too high (over 32 V)	Check DC input, refer to specified input range
Solar supply over voltage	The solar input voltage is too high (above 32 V)	Check solar input, refer to specified input range
No battery sensor connected	The supplied battery sensor is not connected or is faulty	Connect battery sensor, if faulty return to supplier
Battery SoC low! Disconnect all loads	House battery is almost flat	Reduce/remove loads on house battery
Battery voltage low! Disconnect all loads	Loads exceeding charge available from input sources	Connect additional input source or disconnect loads
Bad cable detected	Too much voltage drop between charger and battery sensor	Check cable for correct sizing requirements
Load Disconnect output shorted	Load disconnect is connected directly to battery supply or is overloaded	Check wiring and ratings If problem persists, contact supplier

## Other issues

FAULT	ACTION
Low output current can occur when the unit is hot and temperature derating is implemented to protect the Charger	Check that the unit is in a well ventilated space
The current display shows a negative current when there are no loads on the house battery and the house battery is charging	The current shunt connection is reversed
Noticeable oscillations between Boost and Absorption stages	Check and select the correct battery type

### 3.7 The RedVision App

The RedVision App allows users to monitor up-to-date house battery and charge information at any time during the charging process. Users can check battery charge status, estimated charge time and State of Charge (SoC) per hour over a day and per day over a month. It also allows users to select charging profiles specific to the battery type and size. When connected to a RedVision Distribution Box, the app allows users to control multiple on-board devices from their smartphone; for example turning lights, inverter, water pumps and other loads such as televisions, electric steps and fridges on or off. It also provides the user with the ability to monitor water levels and temperature. The RedVision App replicates MOST of the display and switching features of the Display.

#### NOTICE

The RedVision App and its interactions with the Manager30 System have not been tested on all smartphones available on the market so is not guaranteed to work on all devices. However, the app has been designed to work with:


- IOS 11. 1 (or later)
- Android 7.0 (or later)
- Bluetooth® 4.0 (or later).

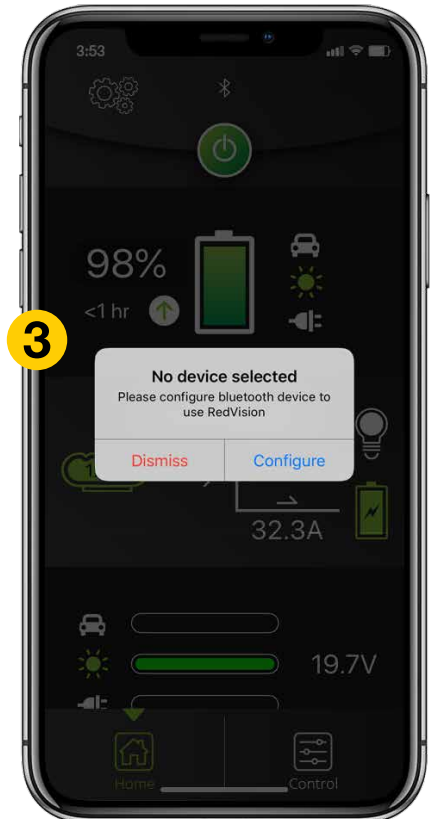
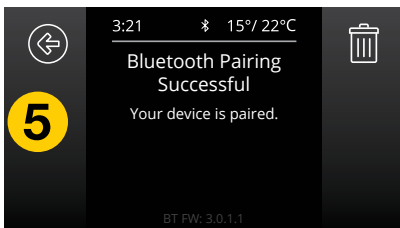
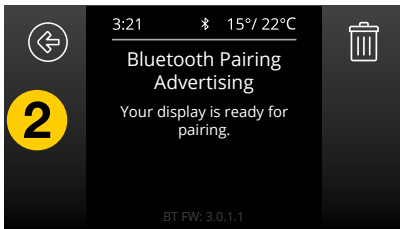
For a full list of compatible devices as they become validated, please visit:

[www.redarc.com.au/redvision](http://www.redarc.com.au/redvision)



## Bluetooth® Pairing Instructions

1. Install the RedVision or Configurator App (scan the corresponding QR code **1** or search for “REDARC” on your device’s app store)
2. On the Display, press Left, navigate to display settings and press the Bluetooth® Soft Key – this should say “Your display is ready for pairing” **2**
3. Open the RedVision or Configurator App
4. On the RedVision App, if you get a “No device selected” pop-up, click “Configure” **3**. If using the Configurator App, move to step 5.
5. Choose your Display from the list (this should match the serial number on your Display, which can be found in R-Bus Diagnostics on the display )
6. Read and agree to any disclaimers displayed.
7. Wait for passcode prompt (this may pop up or show up as a notification depending on your phone)
8. Enter the 6-digit code shown on the Display **4**
9. “Your device is paired.” **5**



## Subsequent Connections

Once a smartphone has been paired with a RedVision Display, it will automatically reconnect with that Display when the app is opened.

If you have multiple Redvision Displays paired and you want to switch between which is connected to your smart phone, tap on the 3 gear symbol on the top left of the app.

The available paired Displays will be shown. Select the one you want to connect to.



## Connecting Multiple Devices

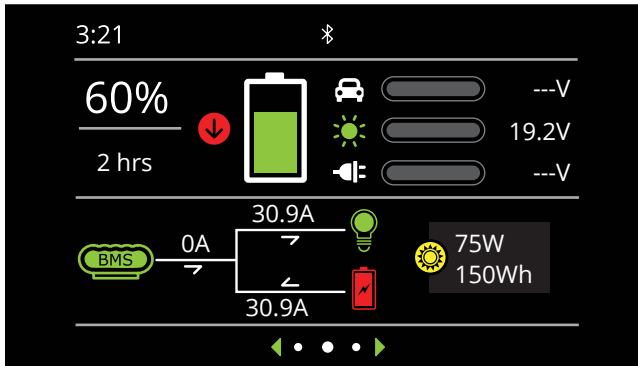
The RedVision Display can manage multiple paired devices although only one can be connected at a time. Closing the app will disconnect the device from RedVision.

Pairing a second device is the same as above.

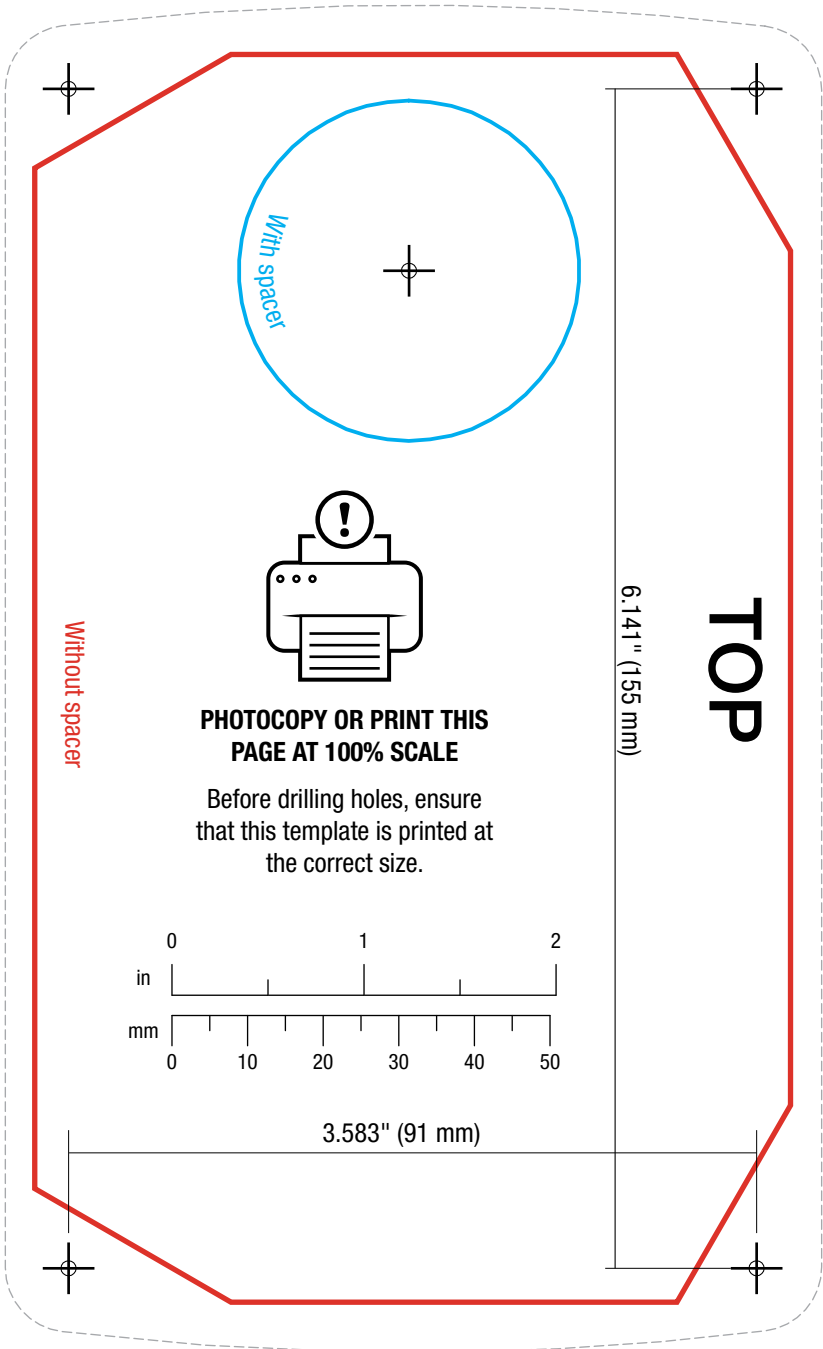
When the RedVision App is closed on one device, the RedVision App can be opened on another device and will connect automatically if it has previously been paired.

## 3.8 Frequently Asked Questions

- Q** I have damaged my Power Cable and need to replace it, do I have to buy a special kind of cable.
- A** To ensure the correct operation of The Manager30, REDARC advise that if the supply cord is damaged it must be replaced by a special cord available from the manufacturer.
- Q** I am running a load from my house battery, but it does not seem to register on The Manager30 Display, why can I not see this current draw?
- A** This is generally caused by incorrect wiring of the Battery Sensor. Ensure no equipment earths go direct to the house battery negative or to the house battery end of the shunt. They must all go to common or chassis ground or to the ground end of the shunt.
- Q** My Input Status screen shows a voltage on the Solar input but the bar graph shows that no charge is coming from the Solar input, what does this mean?
- A** A partially shaded panel (or low-light conditions such as dawn or dusk) will increase the target solar panel voltage level to match the maximum power point. In this situation solar will be selected as a source however little or no current will be flowing into the battery.



- Q** I have just finished wiring The Manager30 and when I turn the unit on the Display says 'No Battery Sensor Detected', is my unit faulty?
- A** The Battery Sensor has a time-out function in-built into the unit. If the Battery Sensor is wired to Power and Ground for a considerable amount of time before the Main Unit is connected this message may appear. Try disconnecting the unit completely in the following order. Ensure all charging sources are disconnected. Unplug the Green connector on the charger. Disconnect the Battery Sensor red connection on the auxiliary battery. Leave all disconnected for 60 seconds. Reconnect in reverse order and retry. If the fault still occurs, there may be an issue with your Manager, please contact REDARC Electronics for support.



# 5 TWO-YEAR PRODUCT WARRANTY — NORTH AMERICA

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

A 100% Australian-owned company, we have met the needs of customers in transport and other industries through exciting, innovative thinking. We believe in total customer satisfaction and practice this by offering our customers:

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

In the unlikely event that a technical issue arises with a REDARC product, customers are encouraged to initially contact the REDARC Technical Support Team at the phone number and e-mail listed in clause 24 for prompt and efficient diagnosis and product support.

REDARC Corporation Pty Ltd ("REDARC") offers a warranty in respect of its Products purchased from an authorized distributor or reseller of REDARC by a person who is the original retail purchaser ("Purchaser"), on the terms and conditions, and for the duration, outlined below in this document ("Warranty").

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

## Offer and duration of product warranties

2. REDARC warrants that its Products will be free, under normal application, Installation, use and service conditions, from defects in materials and workmanship affecting normal use, for 2 years from the date of purchase ("Warranty Period").
3. The replacement of any component or part of your unit under warranty will not extend the period of warranty.
4. Where a Product malfunctions or becomes inoperative during the Warranty Period, due to a defect in materials or workmanship, as determined by REDARC, REDARC will, in exercise of its sole discretion, either repair or replace the defective Product. If REDARC determines that the defective Product cannot be repaired or replaced, then REDARC will provide a refund to the Purchaser for the purchase price paid for the defective Product. REDARC will cover any shipping cost for replacement.
5. For purposes of clarity, "repair or replace the defective Product" does not include any removal or installation costs or expenses, including, without limitation, any labor costs or expenses, shipping costs to return non-conforming Products or any damages that may occur during the return of Product to REDARC.
6. The remedies set forth herein constitute the exclusive and maximum liability of REDARC, to the extent permitted by applicable law, with respect to the manufacture, sale, delivery, installation, operation or use of the Products, whether arising out of contract, negligence, tort or under any warranty or other legal theory.

## Exclusions and limitations

7. This Warranty will not apply to, or include any defect, damage, fault, failure or malfunction of a Product, which REDARC determines, in exercise of its sole discretion, to be due to:
  - 7.1 normal wear and tear or exposure to weather conditions over time;
  - 7.2 accident, misuse, abuse, negligence, vandalism, alteration or modification;
  - 7.3 used or second-hand products;
  - 7.4 non-observance of any of the instructions supplied by REDARC, including instructions concerning installation, configuring, connecting, commissioning, use or application of the Product, including without limitation choice of location;
  - 7.5 failure to ensure proper maintenance of the Product strictly in accordance with REDARC's instructions or failure to ensure proper maintenance of any associated equipment or machinery;
  - 7.6 repairs to the Product that are not strictly in accordance with REDARC's instructions;
  - 7.7 installation, repairs or maintenance of the Product by, or under the supervision of, a person who is not a qualified auto electrician or technician, or if non-genuine or non-approved parts have been fitted;
  - 7.8 faulty power supply, power failure, electrical spikes or surges, lightning, flood, storm, hail, extreme heat, fire or other occurrence outside the control of REDARC; or
  - 7.9 use other than for any reasonable purpose for which the Product was manufactured.
- 7.10 use or installation in violation of the instructions or restrictions prescribed by any applicable standard or code, including those contained in the latest National Electrical Code, Standards for Safety of Underwriters Laboratory, Inc. (UL) the American National Standards Institute (ANSI), or the Canada Standards Association (CSA).

## 8. REDARC shall not be liable for:

- 8.1 any loss of profit, direct, indirect, special, penalty, incidental, secondary, contingent or consequential damages or expenses of any kind resulting from a breach of this warranty; including without limitation damages resulting from loss of use, profits, business or goodwill, even if REDARC was advised of or was otherwise aware of the possibility of such damages.
- 8.2 service, labor, installation or delivery charges incurred in removing or replacing a Product.
9. Warranty claims in respect of a Product must be made in writing to REDARC and received at the postal address or email address specified in clause 24 within the Warranty Period. Such claims must include the following:
  - 9.1 details of the alleged defect or fault and the circumstances surrounding the defect or fault;
  - 9.2 evidence of the claim, including photographs of the Product (where the subject of the claim is capable of being photographed);
  - 9.3 the serial number of the Product, specified on the label affixed to the Product; and
  - 9.4 proof of purchase documentation for the Product from an authorized distributor.
10. The return of any Products without the prior written instructions of REDARC will not be accepted by REDARC.
11. Without limiting any other clause in this Warranty, REDARC has the right to reject any Warranty claim made by a Purchaser pursuant to this Warranty where:
  - 11.1 the Purchaser does not notify REDARC in writing of a Warranty claim within the Warranty Period;
  - 11.2 the Purchaser does not notify REDARC in writing of a Warranty claim within 1 month of becoming aware of the relevant circumstances giving rise to the claim, so that any further problems with the Product are minimized;
  - 11.3 the serial number of the Product has been altered, removed or made illegible without the written authority of REDARC;
  - 11.4 the Purchaser is unable to provide proof of purchase documentation in accordance with clause 7.4 or evidence that the Product was properly installed and removed (if relevant), and that proper maintenance has been performed on the Product, by, or under

the supervision of, a qualified auto electrician or technician, in accordance with the instructions of REDARC.

12. If the Product is found to be working satisfactorily on return to REDARC or upon investigation by REDARC, the Purchaser must pay REDARC's reasonable costs of testing and investigating the Product in addition to shipping and transportation charges. Where REDARC is in possession of the Product, the Product will be returned to the Purchaser on receipt of the amount charged.
  13. Any replaced Products or components of Products shall become the property of REDARC may, in exercise of its sole discretion, deliver another type of Product or component of a Product (different in size, color, shape, weight, brand and/or other specifications) in fulfilling its obligations under this Warranty, in the event that REDARC has discontinued manufacturing or supplying the relevant Product or component, so long as the replacement Product or component performs at substantially the same level and carries out substantially the same function as the Product or component being replaced.
- ## Other conditions of Warranty
15. If the Purchaser acquired a Product for the purpose of resupply, then this Warranty shall not apply to that Product. In particular, the sale of a Product via an online auction, online store or other internet website by a party that is not an authorized distributor or reseller of the Product will be deemed to be a resupply and will render this Warranty void. A Purchaser shall only be entitled to the benefit of this Warranty after all amounts owing in respect of the Product have been paid.
  17. To the maximum extent permitted by law, REDARC does not warrant that the operation of the Products will be uninterrupted or error-free.
  18. To the maximum extent permitted by law, REDARC's determination of the existence of any defect and the cause of any defect will be conclusive.
  19. The agents, officers and employees of any distributor or reseller of the Products and of REDARC are not authorized to vary or extend the terms of this Warranty.
  20. REDARC shall not be responsible or liable to the Customer or any third party in connection with any non-performance or delay in performance of any terms and conditions of this Warranty, due to acts of God, war, riots, strikes, warlike conditions, plague or other epidemic, fire, flood, blizzard, hurricane, changes of public policies, terrorism and other events which are beyond the control of REDARC. In such circumstances, REDARC may suspend performance of this Warranty without liability for the period of the delay reasonably attributable to such causes.
  21. **Except for the foregoing Warranty, there are no other representations, conditions or warranties express or implied with respect to the Products, including representations, conditions or warranties of merchantability, fitness for a particular purpose or non-infringement which conditions, representations and warranties are expressly disclaimed, to the extent permitted by applicable law.**
  22. REDARC reserves the right to use new, reconditioned, refurbished, repaired or re-manufactured products or parts in the repair or replacement of any Product covered by this Warranty.
  23. If a clause or part of a clause in this Warranty can be read in a way that makes it illegal, unenforceable or invalid, but can also be read in a way that makes it legal, enforceable and valid, it must be read in the latter way. If any clause or part of a clause in this Warranty is illegal, unenforceable or invalid, that clause or part is to be treated as removed from this Warranty, but the rest of this Warranty is not affected.

## REDARC's contact details

24. REDARC's contact details for the sending of Warranty claims under this Warranty are:

REDARC Corporation Pty Ltd  
c/o SHALLCO, INC.  
308 Component Dr.  
Smithfield, NC 27577  
Email: [power@redarcelectronics.com](mailto:power@redarcelectronics.com)  
Telephone: +1 (704) 247-5150 if you are calling from the USA  
+52 (558) 526-2898 if you are calling from Mexico  
+1 (604) 260-5512 if you are calling from Canada

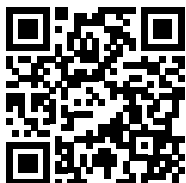
(calls are answered between 8am and 5.30pm Australian Central Standard Time (ACST))

25. REDARC reserves the right to modify this Warranty from time to time and any modifications shall be effective for all orders placed on or after the effective date of such revised warranty. Some states, provinces or territories do not allow exclusion or limitation of certain types of damages, or permit limitations on the length of implied warranties, so certain of these warranty limitations may not apply to the Purchaser. This Warranty gives the Purchaser specific legal rights. The Purchaser may also have other rights which vary from state to state, province to province or territory to territory. If any term of this Warranty is held to be illegal or unenforceable, the legally and enforceability of the remaining terms shall not be affected or impaired. This Warranty allocates risk of Product failure between the Purchaser and REDARC, and REDARC's Product pricing reflects this allocation of risk and the limitations of liability contained in this Warranty.

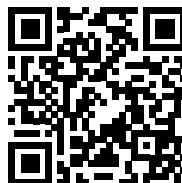
**UNDER NO CIRCUMSTANCES SHALL REDARC'S AGGREGATE LIABILITY ARISING OUT OF OR IN CONNECTION WITH A DEFECTIVE PRODUCT, IN CONTRACT, TORT OR OTHERWISE, EXCEED THE PURCHASE PRICE OF THE PRODUCT TO WHICH SUCH LIABILITY RELATES.**

## FREE TECHNICAL ASSISTANCE

For product and technical support contact your regional distributor, call our head office between 8:00 a.m. to 5:30 p.m. Australian Central Standard Time, Monday to Friday, or send us an e-mail.



Pour accéder  
au manuel  
d'utilisation  
en Français



Para ver el  
manual en  
Español

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