

THE POWER OF

REDARC

THE MANAGER30 BATTERY MANAGEMENT SYSTEM

IN THIS MODULE

1. Selecting The Right Setting for your battery
2. Determining Alternator Type
3. Mounting The Unit
4. Wiring the battery sensor
5. The Ignition Trigger & Load Disconnect Feature
6. Charging Stages
7. Faults and Warnings
8. Solar Input
9. Video

SELECTING THE RIGHT SETTING FOR YOUR BATTERY

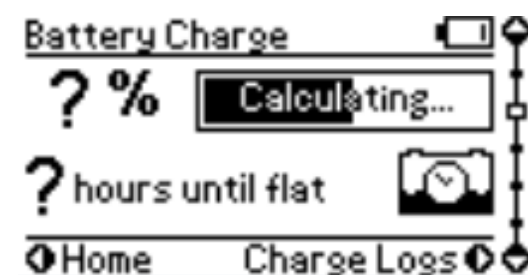
WHY BATTERY SPECIFICATIONS ARE IMPORTANT

Maximum charging voltage: The most important step required for initial setup is Battery Type and Size selection. Please refer to the battery manufacturers specification sheet for Size (AH) and Type specifications. The Manager30 calculates* SOC based on current in and out of the battery & total battery size. If you are unsure of the type of your battery please select the Gel setting.

Should power to the Battery Sensor be removed at any time, the unit will revert to the Gel setting and prompt the user to input their Battery Type again. The Battery Size setting will be retained in memory.

Maximum charging current required: The Manager30 allows the user to set the maximum charge current for their battery, making it suitable for charging batteries as small as 40Ah 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 current 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.

*The first time a Manager30 is connected to a battery it will need to charge the battery until it is full. Until the battery is charged the screen will show “calculating”



*The DISP4300 will not display “calculating” but will show SOC once the battery is charged.

Part Number	LBAT12100	LBAT12100-HD
Nominal Capacity (C20, 25°C to 10.5 V)	100 Ah/1280 Wh	
Nominal Voltage	12.8 V	
Self-Discharge Rate per month	≤ 3%	
Short Circuit Protection	200 to 500 μs	
Recommended Continuous Discharge	50 A (120 minutes)	100 A (60 minutes)
Maximum Discharge	80 A (60 minutes)	170 A (30 minutes)
Peak Discharge (5 seconds)	120 A	400 A
Discharge Cut-Off Voltage	10.0 V	
Life Cycles 80% DOD	2000	
Life Cycles 50% DOD	5000	
Life Cycles 20% DOD	8000	
Recommended Charge Current	≤ 30 A	≤ 50 A
Maximum Charge Current	50 A	50 A
Recommended Charge Voltage	14.6 V ± 0.2 V	
BMS Charge Cut Off Voltage	15.6 V	
Dimension (L × W × H)	305 × 165 × 221 mm	
Weight	11.5 kg	12.5 kg
Cell Chemistry		
Case Material		
Terminal Type		
Charge Temperature Range		



DETERMINING ALTERNATOR TYPE

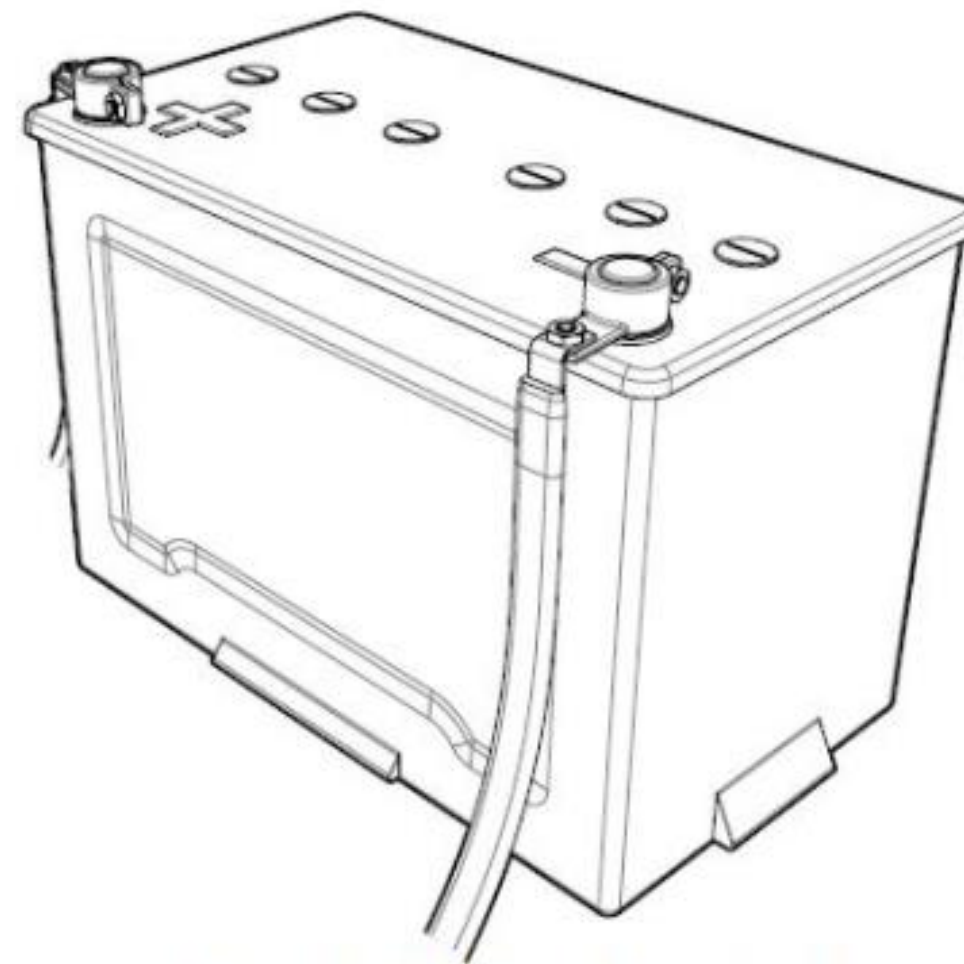
In today's modern vehicles, the days of straight forward dual battery setups are becoming a thing of the past - Variable Voltage Alternators are now becoming standard issue in most modern vehicles.

The type of equipment you may need to correctly charge and maintain your auxiliary batteries depends on whether your vehicle has this technology or not. Variable Voltage Alternators are also commonly known as 'Smart Alternators' or 'Computer Controlled Alternators'.

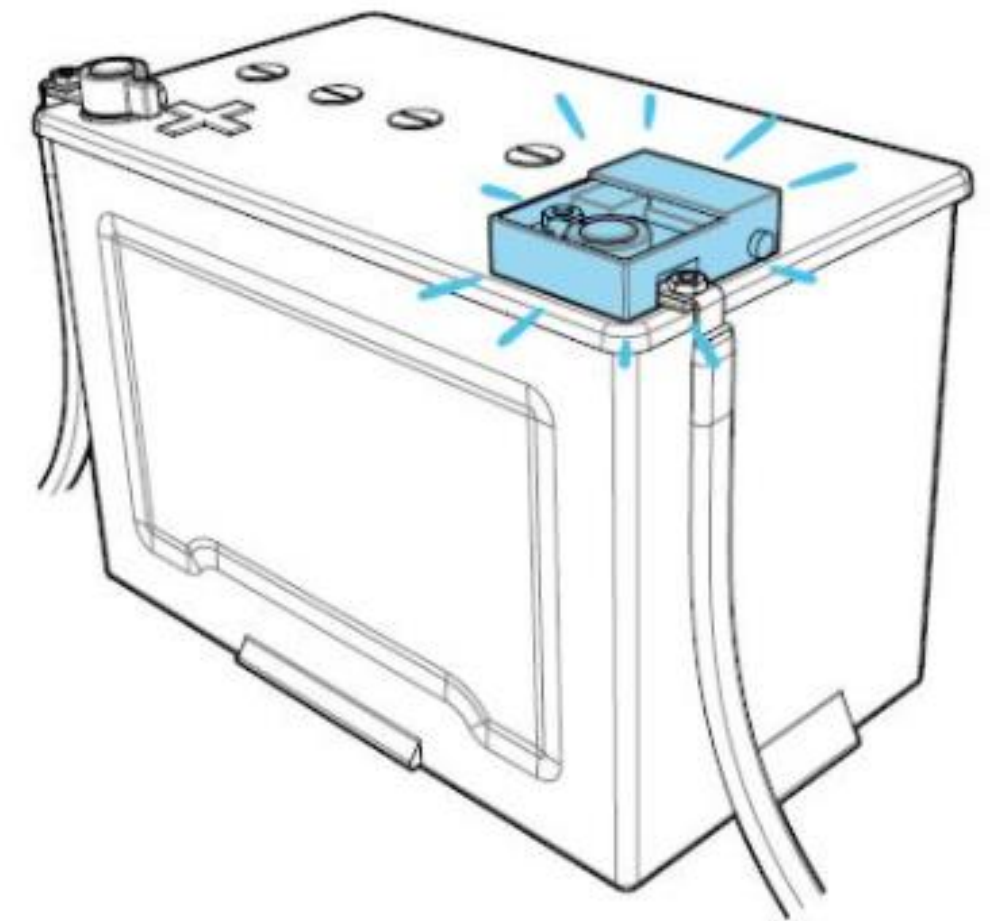
The natural question to ask is, how do I know whether my vehicle has a Variable Voltage Alternator?

Variable Voltage Alternators require some sort of battery sensing technology to determine load coming from the battery and this is done by a battery sensor which is found on one of the battery terminals (usually the battery negative). See images to the right for examples.

In vehicles equipped with variable voltage alternators it is important to chassis earth electrical accessories and provide an ignition trigger to the Manager30



Regular Battery Terminal
(Standard Alternator)



Battery Terminal with Sensor
(Variable Voltage Alternator)

MOUNTING THE UNIT

The electronics inside the Manager30 are not potted like the BCDC chargers so it is important to ensure the Main Unit will not be exposed to rain, snow, sp or bilge water.

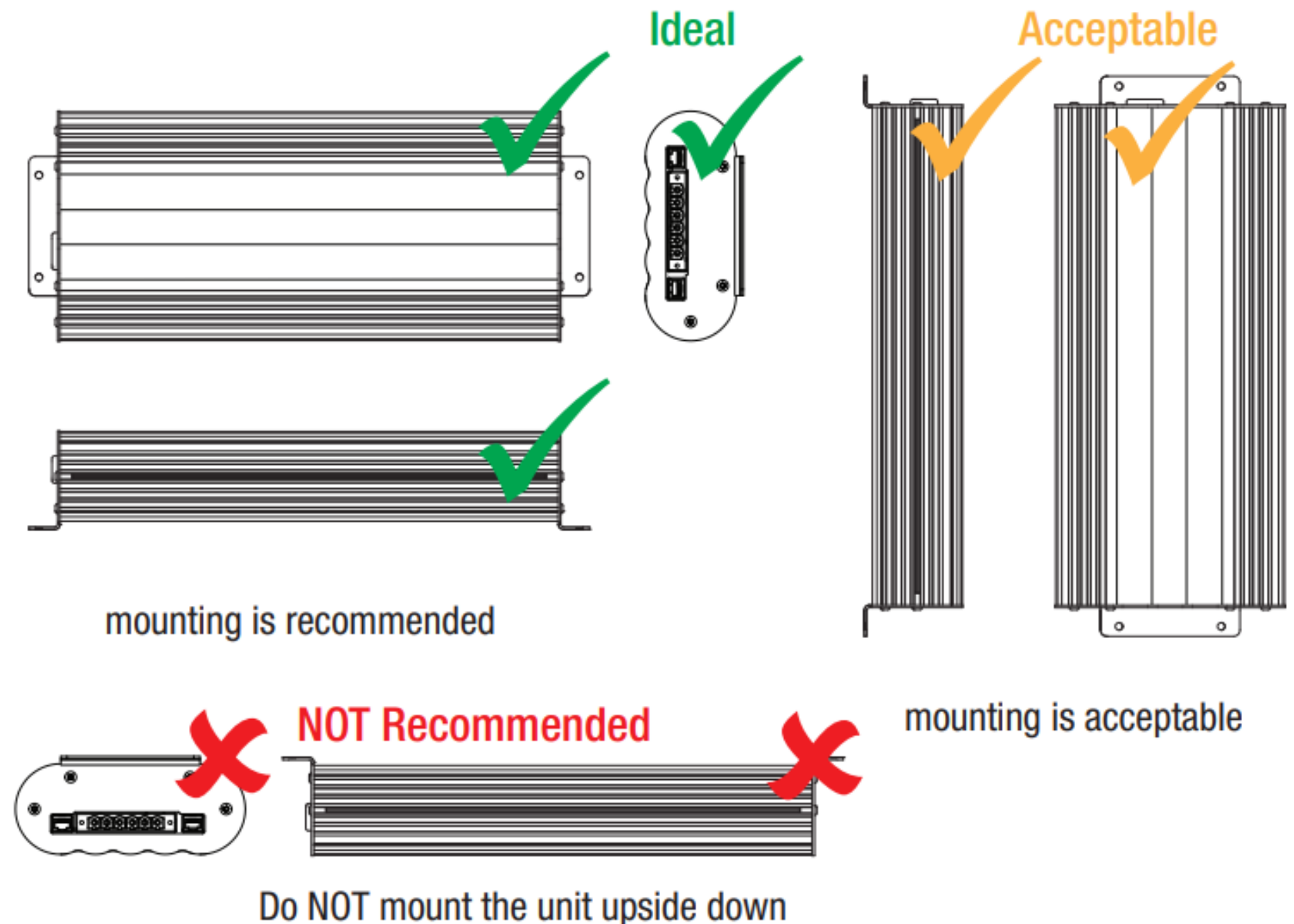
For optimum operation, The Manager30 should be mounted where the temperature is nominally below 95°F and does not exceed a maximum of 140°F. **The Manager30 must not be mounted in the vehicle engine bay.**

As the Main Unit is fan-less it must not be installed in a location with any less than 10cm clearance at the top of the Main Unit, this will allow for airflow across the heatsink fins. The Main Unit needs to be mounted to a flat, solid support using screws or bolts and all four mounting holes. Mounting the unit to a metal surface will also assist on heat dissipation.

The Main Unit should also be installed as close as possible to the house battery and the cable length should be less than 6ft, to ensure voltage is maintained to the auxiliary battery.

REDARC recommends that the Main Unit be mounted to optimise airflow past the heatsink.

Mounting the unit horizontally is recommended and mounting vertically (is still acceptable).



WIRING THE BATTERY SENSOR

One of the most important and often incorrectly installed parts of the Manager30 is the battery sensor. This sensor, usually called a shunt, is the part of the system that measures all current in and out of the battery and using this information the Manager30 can display the battery state of charge (SOC) extremely accurately.

In order for the sensor to tell the SOC correctly, all loads must flow through the sensor. This means there can only be one cable joining the sensor to the negative battery terminal and every other earth connection is to go to the vehicle common ground. Connecting any load to the negative battery terminal will bypass the sensor and will not be considered in the SOC calculations. The result of this is inaccurate SOC being displayed.

In other words, if there is a load connected to the negative battery terminal the SOC will not change on the screen even though the battery is being drained resulting in surprised customers with flat batteries.

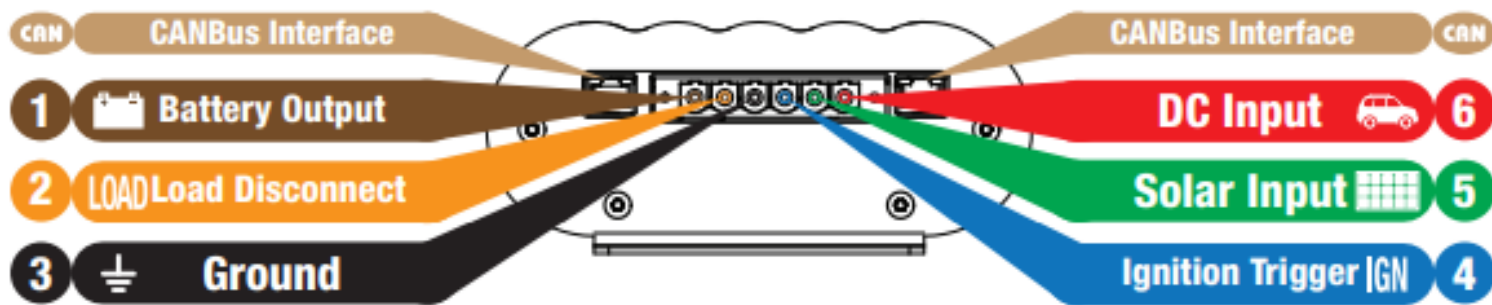
The positive on the battery sensor must be connected to the auxiliary battery positive as this provides the system and user with battery voltage and temperature information. The Manager30 will adjust the charge depending on temperature.

NOTE: ensure the cable between the battery and the sensor is suitably rated to carry the combined system load

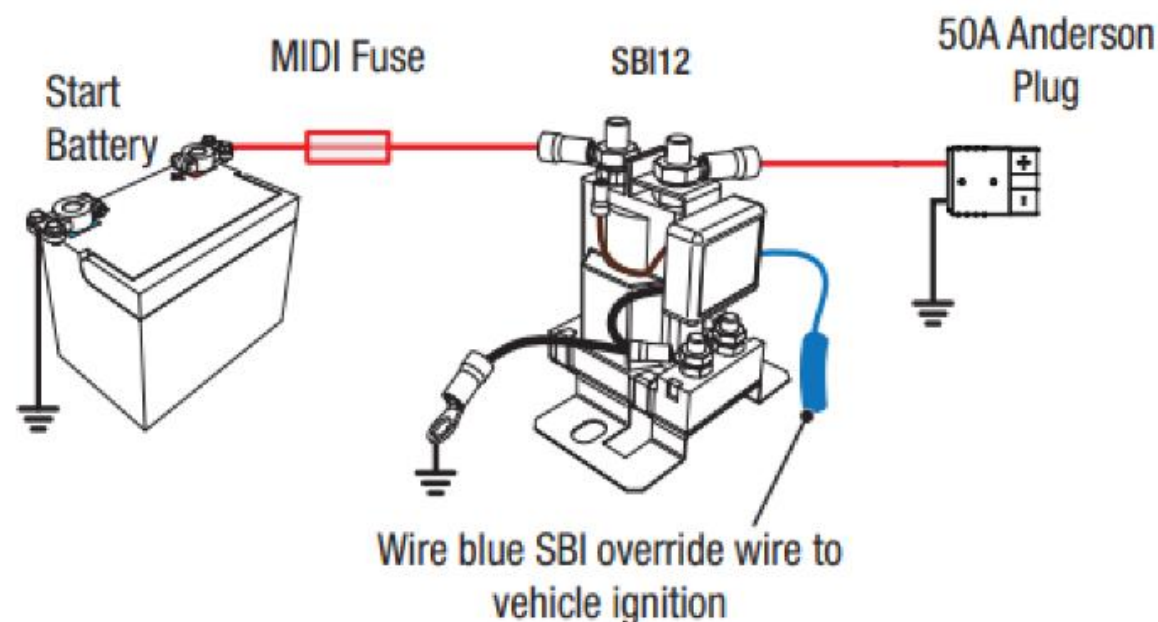


The Manager30 range is capable of charging from all alternator types including variable voltage vehicles.

Wiring an ignition trigger to pin 4 will allow the user to select Auto or IGN from the BMS menu which in turn will reduce the turn on/off thresholds to suit vehicles with Variable voltage alternators.



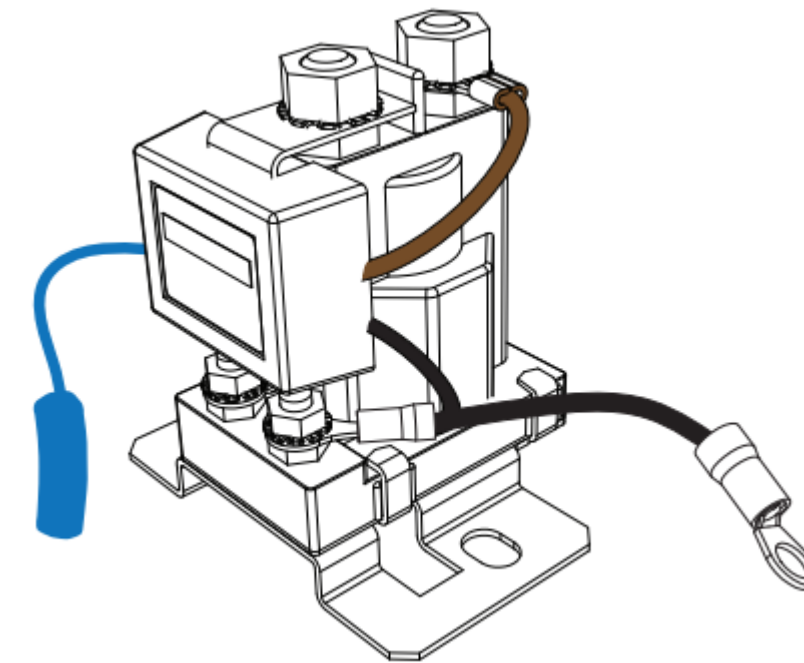
In many cases the Manger will be installed in a trailer or caravan, this can make running an ignition trigger difficult. The best way to simplify the install is to ignition control the Anderson plug using a SBI and bridging pins 4 and 6 of the Manager30. The same can be done for BCDC chargers.



THE IGNITION TRIGGER & LOAD DISCONNECT FEATURE

Load Disconnect

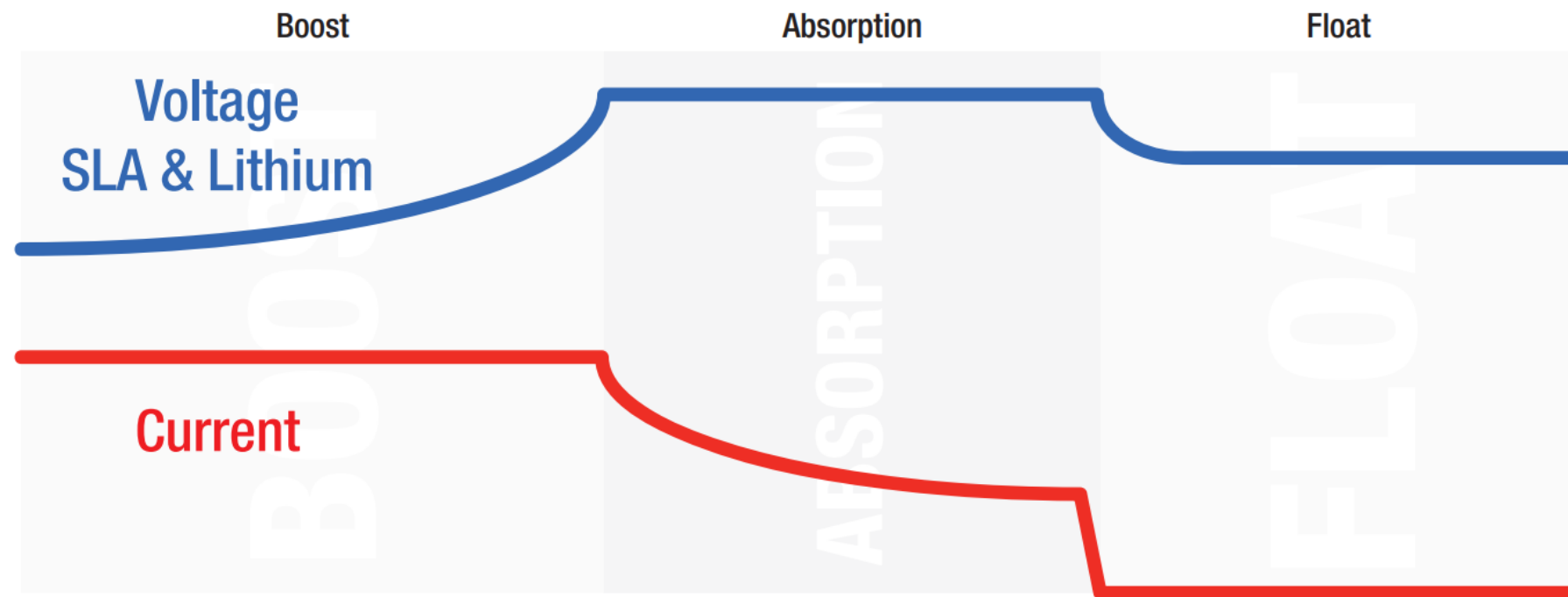
The Load Disconnect wire is a ground (negative) switch to activate a relay for disconnection of any loads running from the house battery. The relay must be 12V with a maximum coil current of 1A and resistor or diode suppression is recommended. The Load Disconnect feature must be activated in the User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



REDARC recommend using the SBI12-BLD as the 12V relay for setting up the Load Disconnect Feature for Non-Essential Loads. Similarly, the SBI12-LLD is recommended for use between the Auxiliary battery and the Essential Loads in a Lithium Battery setup, to protect the Lithium battery from excessive discharge. The power saving feature of the SBI12-BLD/LLD is around 0.16A as opposed to a standard relay of 0.6A meaning more power to run loads.

NOTE: wiring to vehicle ignition is suitable for all vehicle makes, models and alternator types*
(* excludes some Hybrid and Electric Vehicles)

Touring Mode Charging Process



Storage Mode Charging Process

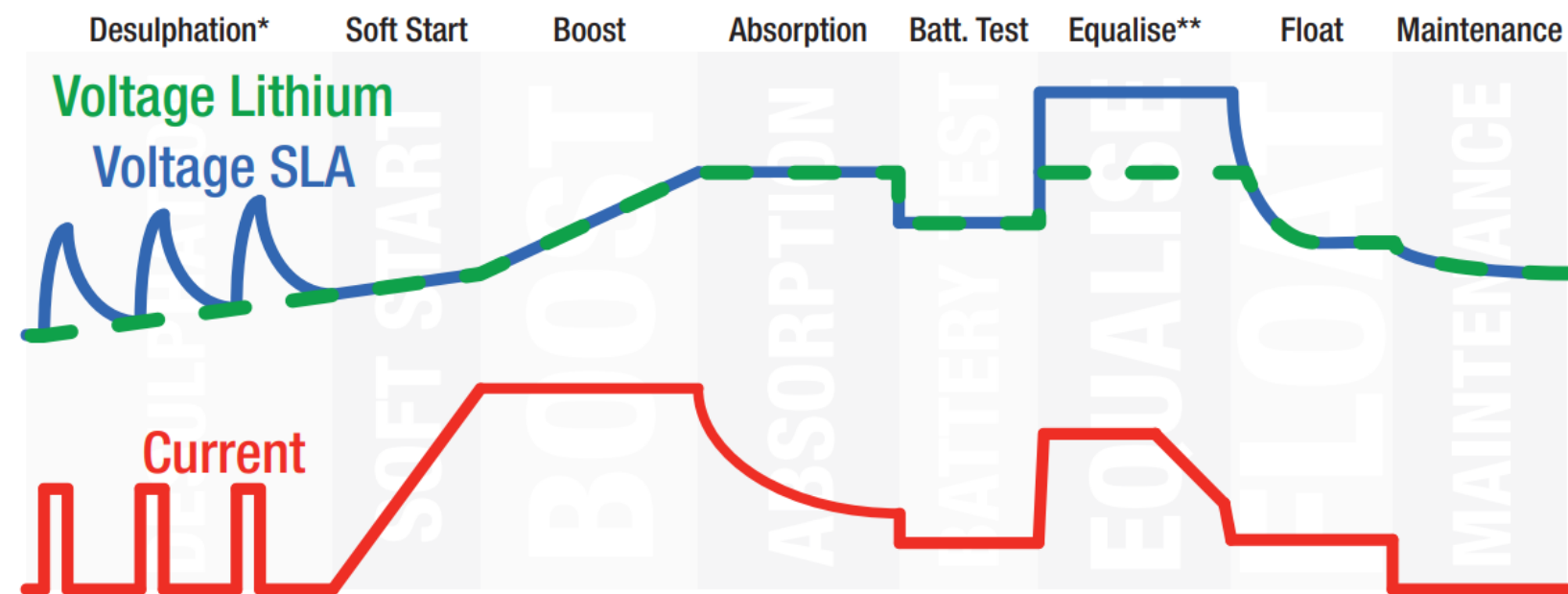


Figure 1.5.2 - Storage Mode Charging Process

*The Lithium profile does NOT incorporate a Desulphation stage.

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

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. 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

Storage mode

Storage mode is designed to charge the house battery to its optimal level and maintain that level while your caravan is in storage. **This mode requires 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, Equalise**, Float and Maintenance stages. Storage mode is designed to detect a wide range of battery fault conditions.

Unlike Touring mode, Storage mode does not continue to cycle through charge profiles. This means that when the charging process is completed, The Manager30 in Storage mode will always remain in either Float or Maintenance stages. Float stage provides 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 necessary.

A common mistake people make is not connecting to a valid charging source while in Storage mode, this results in no charge to the batteries and calls to technical support.

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.

FAULTS & WARNINGS

The Manager30 is designed to detect and advise the operator of a variety of fault conditions and will terminate the charging cycle immediately should a critical fault be detected. This ensures that it will not attempt to charge a faulty battery, which protects The Manager30, house battery and most importantly the user.

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 18V)	Check battery is correct type (12V, 6 cell)
Unit over temperature fault. Allow to cool	The unit has over heated	Allow to cool, charging will recommence automatically
Output battery under temperature fault	Output battery is below 0°C	Charger will halt charging until battery is above 5°C
Output battery over temperature fault	Output battery is above 60°C	Charger will halt charging until battery is below 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

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
Noticable oscillations between Boost and Absorption stages	Check and select the correct battery type

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	Contact supplier
DC supply over voltage	The DC input voltage is too high (over 32V)	Check DC input, refer to specified input range
Solar supply over voltage	The solar input voltage is too high (above 32V)	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
Low battery State of Charge	House battery is almost flat	Reduce/remove loads on house battery
Bad cable detected	Too much voltage drop between charger and battery sensor	Check cable for correct sizing requirements
Load Disconnect output shorted	Load disconnect output faulty	Contact supplier
Battery voltage low! Disconnect all loads	Loads exceeding charge available from input sources	Connect additional input source or disconnect loads

SOLAR INPUT

MPPT Solar Regulator

The Manager30 is designed for use with 12V solar panels. A minimum input voltage of 17.5V 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 9V and as high as 32V; 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 utilises 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.

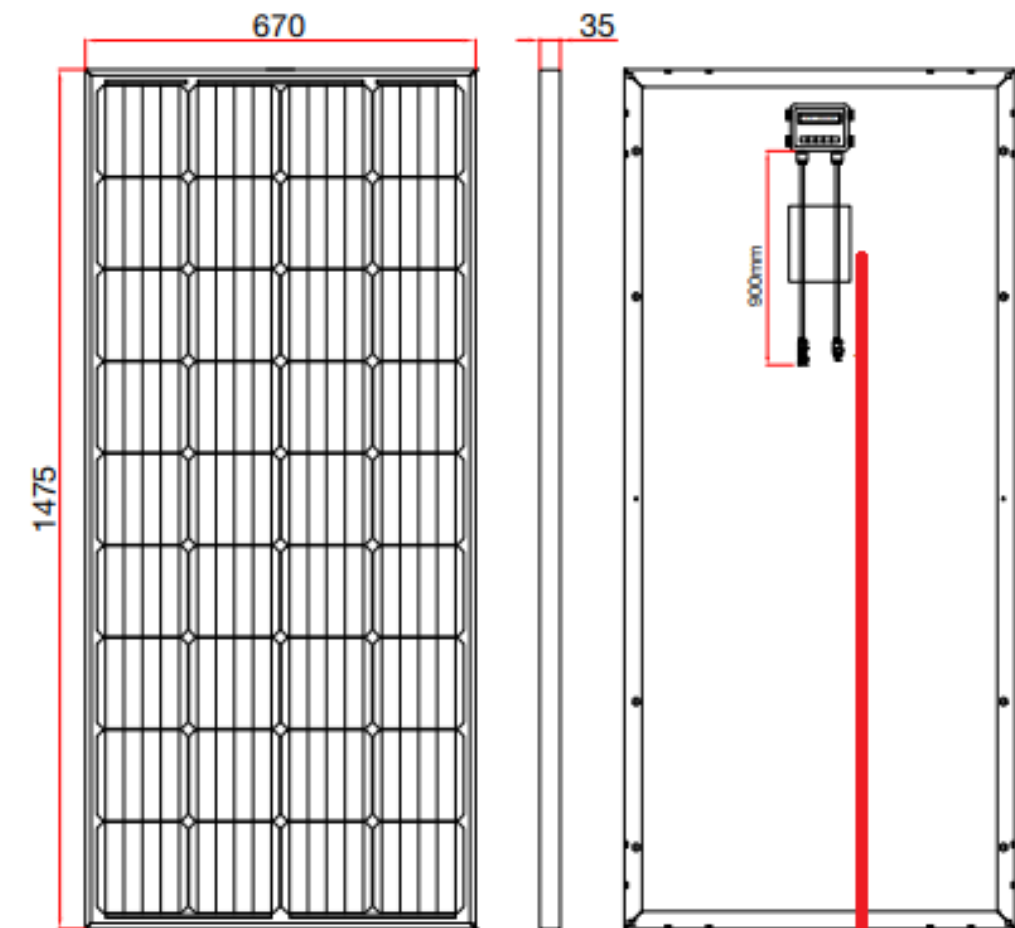
An array of solar panels can be connected to The Manager30 solar input, on the condition that the open circuit output voltage of the array is at least 17.5V and does not exceed 32V. For this reason, 12V panels must be connected in parallel (Refer to Figure 2.6.1). So long as the voltage requirements 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 520W from the solar input.

For installations with a single 12V 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

(Panel specs can be found on the rear of the solar panel see image)

Part Number	BCDC1225D	BCDC1240D
Continuous Current Rating	25A	40A
Vehicle Input Fuse Rating	40A (Not Supplied)	60A (Not supplied)
Output Fuse Rating	REDARC FK40 recommended	REDARC FK60 recommended
Output Power	375W	600W
Vehicle Input Voltage Range ^{*1}	9-32V	
Solar Input Voltage Range ^{*1}	9-32V (unregulated only)	

Output Battery Type	180 WATT MONOCRYSTALLINE SOLAR PANEL
Charging Profile	
- Maximum Volt	
- Float Voltage ^{*1}	
No Load Current	
Standby Current	
Operating Temperature	
Minimum O/P Battery	
Weight	
Dimensions	
Warranty	
Standards	



SPECIFICATIONS

Model	SMSP1180	Conversion efficiency	20.6%
Peak power	180 W	Operating temperature	-40°C to +85°C
Max system voltage	600 V DC	Max power voltage	20.0 V
Cell construction	Monocrystalline	Max power current	9.0 A
Cable length	900 mm	Open circuit voltage	22.3 V
Frame	Anodized aluminium	Short circuit current	9.72 A
Front material	Tempered glass	Power to temperature coefficient	-0.41%/°C
Dimensions	1475 × 670 × 35 mm	Power tolerance	±3%
Net weight	10.7 kg	Standard test conditions	AM1.5 1000 W/m² 25°C

MANAGER30 VIDEO

