

RVtechnicTM

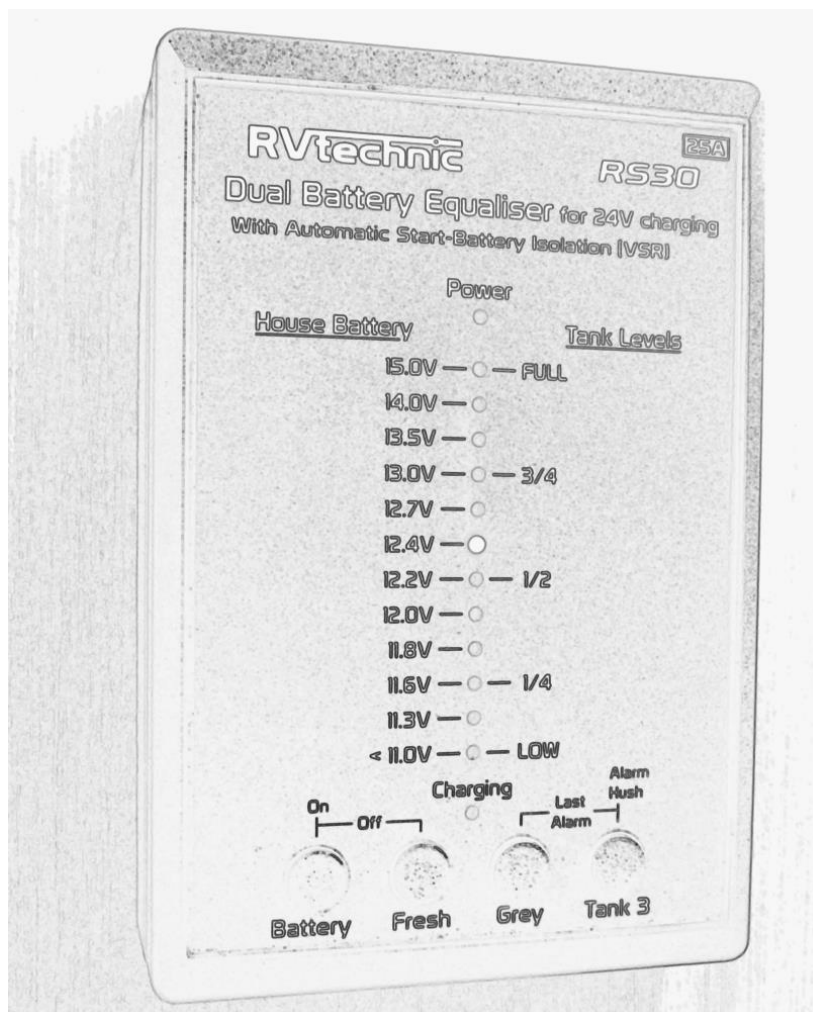
RS30

User Manual &
Installation Guide

Multi-Function Battery Manager for 24volt RVs

With Dual Battery Equaliser, Start-Battery Isolation, Voltage and Tank Meters

- Enables running of 12V appliances in 24V RVs
- Equalises dual 12V house-batteries charging from 24V alternator
- Isolates start-batteries automatically from house appliances when engine is off so no more flat start-batteries
- Water tank meter for 3 tanks including grey water
- Battery voltage meter
- Alarms for house-battery voltage too low / high



- Proudly Designed and Manufactured in New Zealand
- 2 Year Warranty
- High Efficiency Charging System

Thank you for purchasing an RVtechnic RS30 Multi-Function Battery Manager. We trust the product will provide excellent convenience, functionality and reliability for your motorhome or marine vessel.

1. Functionality and Features of the RS30:

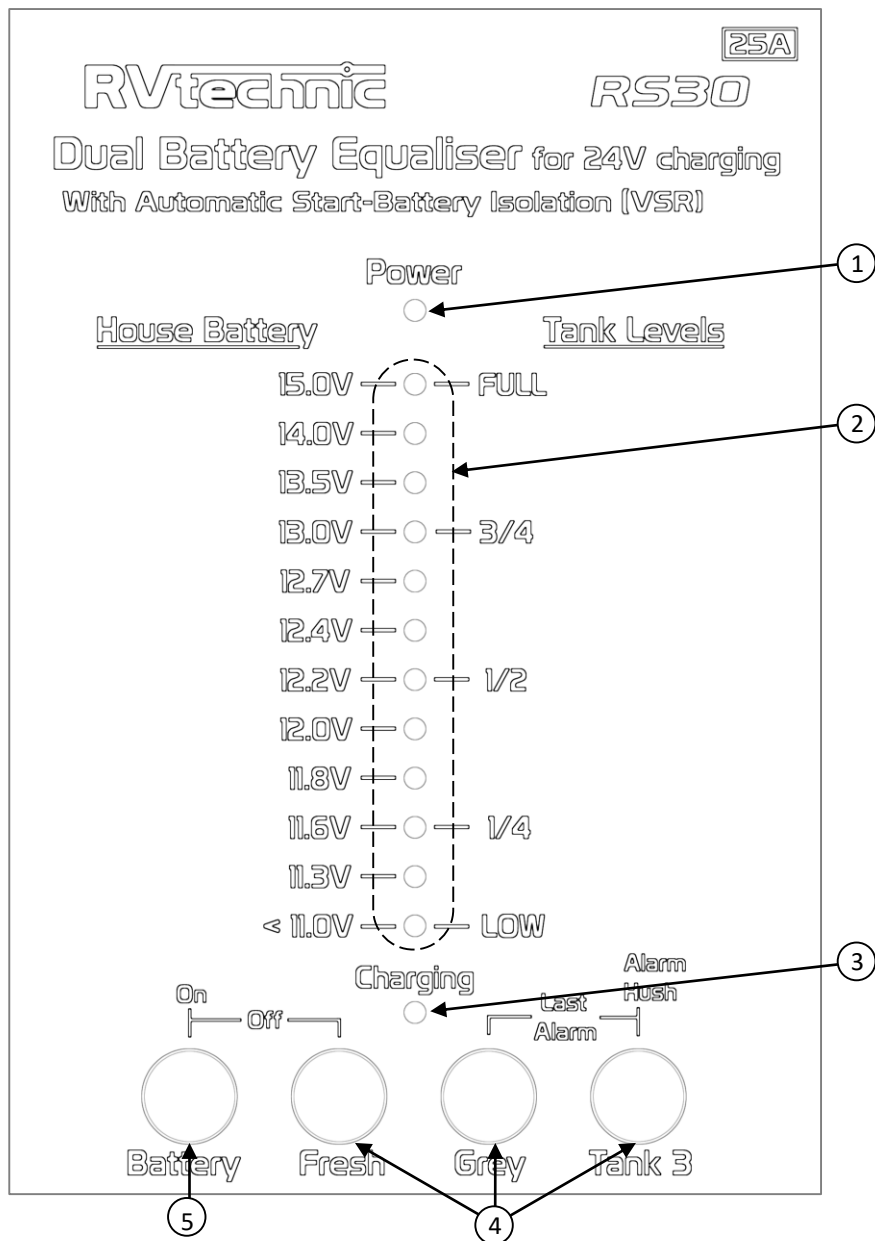
- Enables running of 12volt appliances in 24volt RVs even while driving (ie. fridge, stereo)
- Fully automatic charging of 12volt house-batteries from a 24volt alternator
- High efficiency 24volt alternator to 12volt battery charging using a patented system with no lossy components in the charge circuit, therefore maximum charge into your batteries and the RS30 stays cool with no fans and no heatsinks
- Equalises dual 12volt house-batteries during charging so neither battery becomes over charged or depleted
- Automatically disconnects start-batteries from house-batteries when RV engine shuts off (avoids flattening start-batteries when running appliances while parked)
- Alarms when house batteries are too low or too high (under 11.8V, over 15.0V). Peace of mind when drawing power from or charging your expensive house-batteries
- Monitors up to 3 water tanks including grey water (tank sensor cables to be purchased separately)
- Simple to integrate with solar panels
- Automatically reduces charge rate if house-batteries are over charging (if both house-batteries exceed 15.1V each)

Important :

- Please read this guide in full prior to installation and use
- Installation must be carried out in direct accordance with this guide.
- To avoid risk of serious damage, fuses must be replaced with correct fuse type and rating (refer to Trouble Shooting Guide in this manual).

2. Front Panel Functions

Note:
 When RV engine is off, both house-batteries are connected in parallel by the RS30 unit. Both house-batteries will therefore have the same voltage - indicated by display LEDs



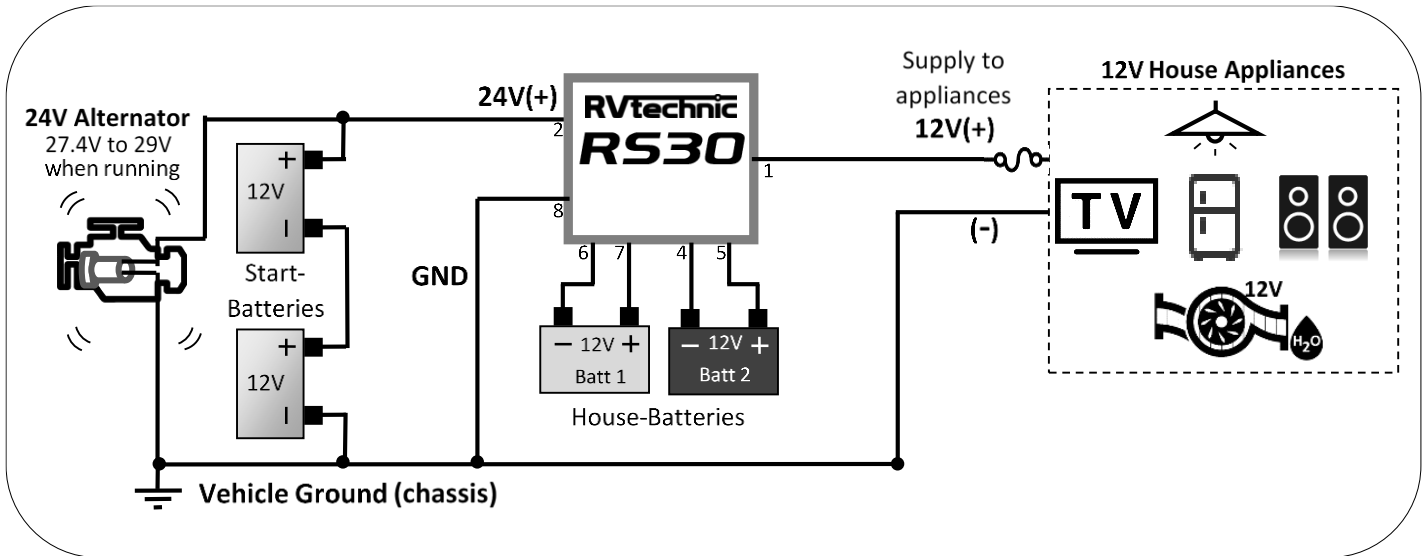
Key:

- 1) **Power** LED flashes once per minute when RS30 is on
 - 2) Indicator LEDs for voltage or tank levels (voltage displays as a single LED when buttons not pressed)
 - 3) **Charging** LED is on when house-batteries are charging from 24V supply / alternator
 - 4) Push buttons to indicate water tank levels
 - 5) Push button to indicate house-battery voltage (as a row of LEDs)
- Press **Battery** and **Fresh** buttons together to turn off the unit
 - Press **Battery** button to turn the unit on from off-state
 - Press **Tank 3** button to hush repeating alarm sounds
 - Press **Grey** and **Tank 3** buttons together to display the most recent alarm code

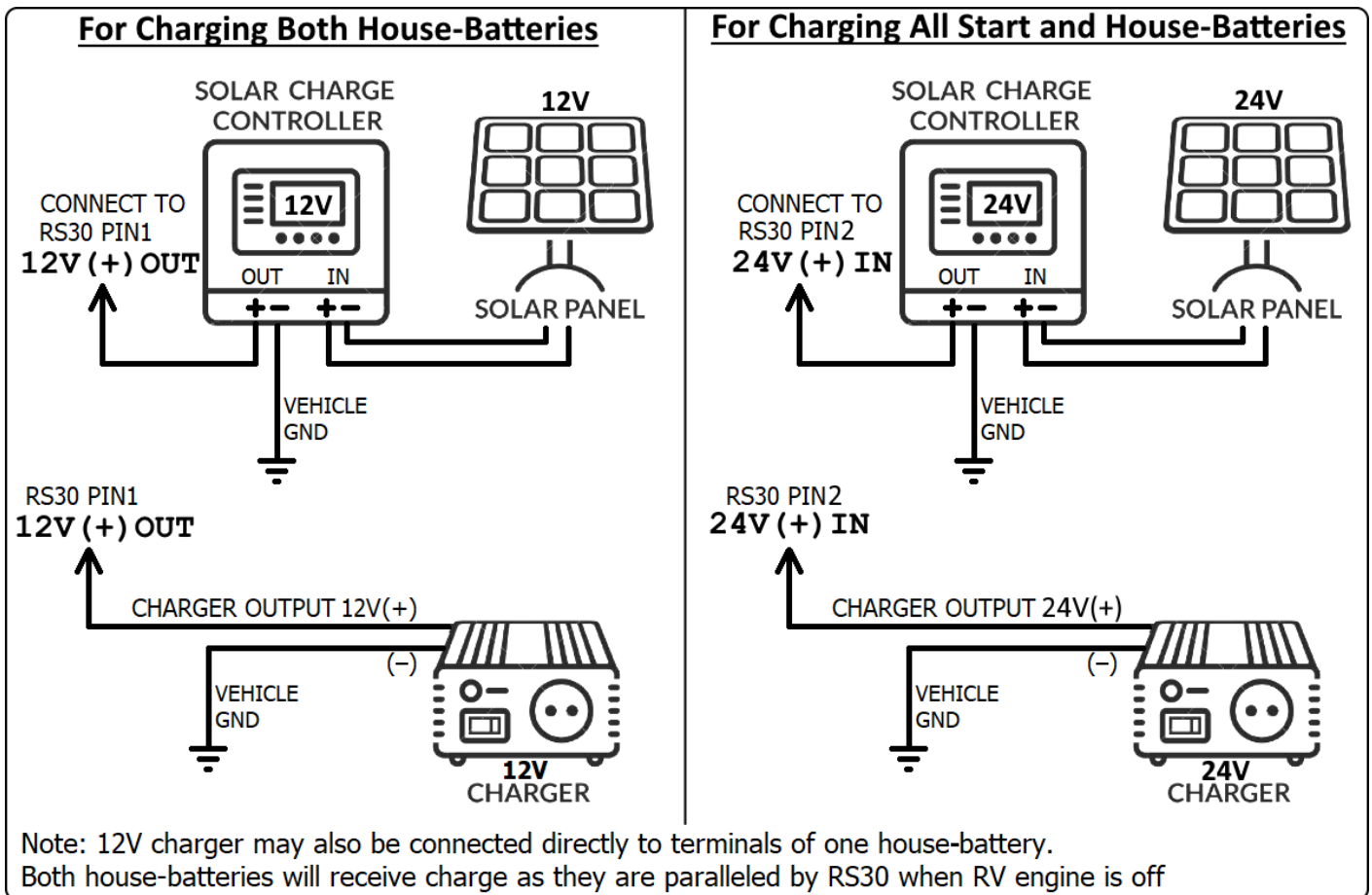
3. Installation

- Connect cables to RS30 **before** connecting cables to batteries – to reduce risk of damage from energised wires either shorting together or contacting RS30 circuit board during install.
- Installation should only be performed by a person familiar with wiring DC electrical equipment. If unfamiliar, please use an automotive electrician or similarly qualified person.

RS30 Connections in a 24volt RV



Connecting Solar / 230V Mains Charger to RS30



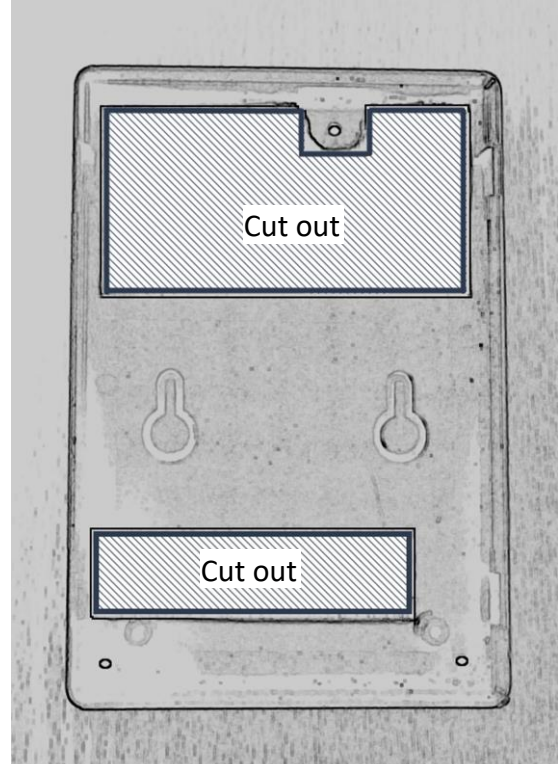
Wall mounting

1. Separate front from rear case (pull apart)



2. Using rear case as a guide, cut out wall panel sections to enable cable access.

3. Screw rear case onto wall using enclosed screws



Installation Notes:

1) House-Battery Sizing:

- 12volt flooded lead-acid, SLA or AGM batteries (deep-cycle or standard) can be used
- Minimum 100Ah capacity per house-battery is necessary to enable proper battery equalising if running a fridge or other high-drain 12V appliances while driving. Otherwise lower Ah house-batteries (minimum 10Ah) may be used.
- Maximum 800CCA (cold cranking amps) per house-battery is recommended to avoid high charging currents that may blow RS30 fuses (25Amp ATO type). Higher CCA rated batteries may be used if the 24V(+) wire from start-batteries to RS30 is >4m long and <5.5mm² conductor size (AWG10 or smaller).

2) Cable Sizing:

Recommended AWG12 to AWG10 (3.3mm² to 5.3mm² conductor) for RS30 rear connections: 1,2,4,5,6,7,8 - See figure below. Use 5.3mm² or larger for long cable runs. For connection3 (optional IGN/ENG RUN signal) light wire gauge can be used.

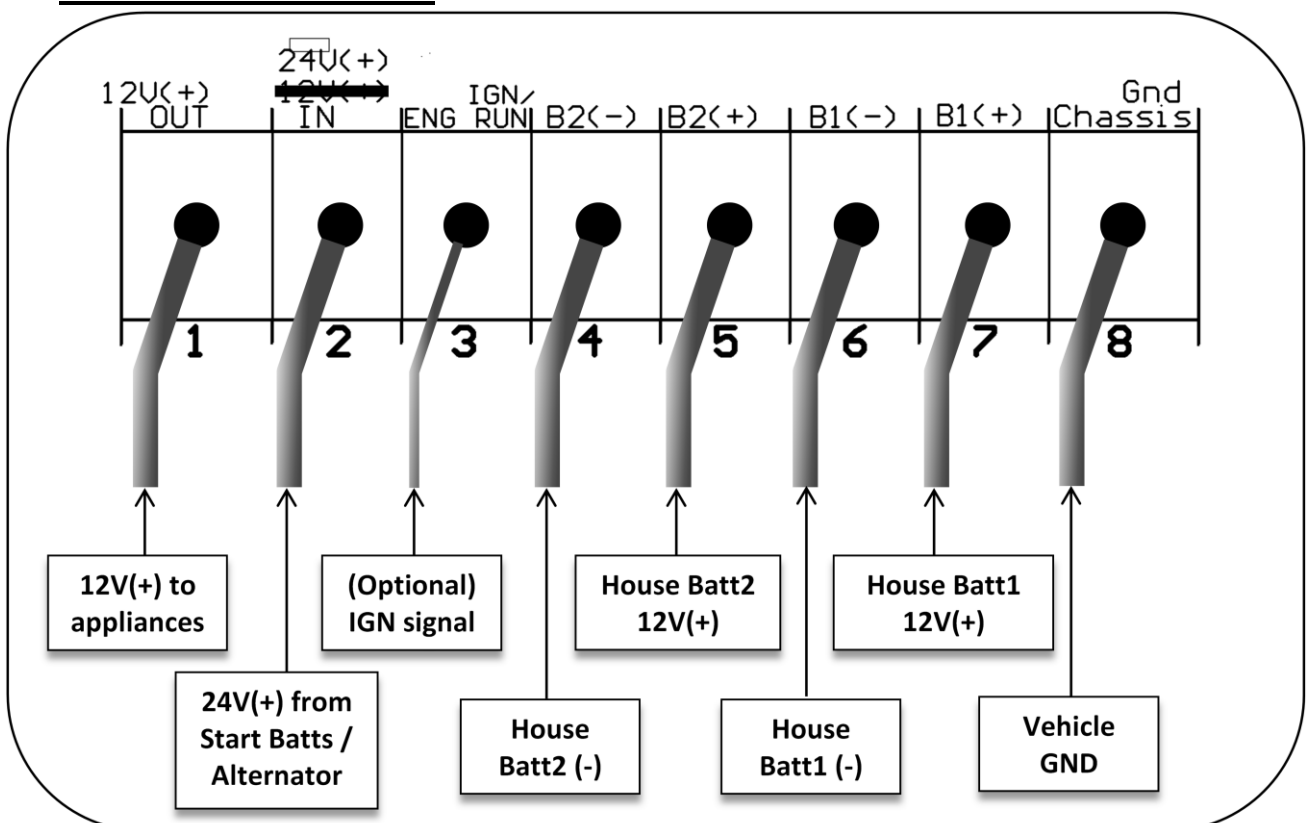
3) House-Battery Connections:

DO NOT connect house-batteries together or to Ground externally. Only connect house-batteries to RS30 terminals as shown below.

4) Connection3 (optional IGN/ENG RUN signal):

This may be connected to either 12V or 24V IGN signal switched by the ignition key (zero volts when key is off) to quicken RS30 automatic switching in/out of **Charging** mode. If connected to IGN signal, the RS30 will switch in/out of **Charging** mode soon after engine is started/stopped. If left disconnected, the RS30 will automatically switch in/out of **Charging** mode by sensing start-battery voltage.

RS30 Rear Connections



4. Alarms

Note: Alarm sound is two short, low tones

While not in Charging mode (RV engine not running):

House-battery voltage	Alarm
Over 15.1V (over-charging from solar or other source)	All batt LEDs flash every 3 secs indicating high batt voltage. Alarm sounds once per minute
11.8V to 11.9V	Batt LEDs flash every 3 secs indicating house-battery voltage. No alarm sound
11.5V to 11.8V	Batt LEDs flash every 3 secs indicating house-battery voltage. Alarm sounds once per minute
Below 11.5V	Batt LEDs flash every 1 sec indicating house-battery voltage. Alarm sounds once every 10 secs

While in Charging mode (RV engine is running):

House-battery voltage	Alarm
Both house-batteries over 15.1V (over-charging from alternator)	Batt LEDs flash every 1 sec indicating high batt voltage. Alarm sounds once every 10 secs. RS30 automatically switches out of charging mode after 1 minute of this condition

Other alarms:

Condition	Alarm
Rear fuse blown (25A ATO type), or poor house-batt connection	Power and Charging LEDs flash together once every 3 secs, alarm sounds once per minute
Fresh tank level drops below 1/4 tank	Single short beep alert. No LEDs flash

5. User Settings

To switch off all sounds including alarm tones:

Hold **Battery** and **Tank3** buttons for 5 seconds and release (then USER settings mode will be active for 3 seconds and power LED will flash). While flashing, Press **Grey** button (sounds status will change from ON to OFF).

Repeat this process to change sounds status from OFF back to ON.

To switch off single LED voltage display:

(By default a single LED always displays to indicate house-battery voltage while no buttons are pressed. The following process will switch single LED voltage display on/off)

Hold **Battery** and **Tank3** buttons for 5 seconds and release (then USER settings mode will be active for 3 seconds and power LED will flash). While flashing, Press **Fresh** button (single LED display mode will change from ON to OFF).

Repeat this process to change single LED display mode from OFF back to ON.

Extra voltage-display function:

Press **Battery** and **Grey** buttons together, LEDs indicate 24V input voltage (start-battery voltage). Note that the LEDs indicate exactly half the voltage of the 24V input when this is done.

6. Electrical Specifications

Item	Specification
Recommended house-battery specifications	12volt flooded lead-acid, SLA or AGM batteries (deep-cycle or standard) can be used 2 x 6V batteries connected in series may also be used in place of each 12V house-battery. <u>Amp hour (Ah) Capacity Recommendation:</u> Minimum 100Ah per battery (if running fridge or other high-drain 12V appliances while driving) Minimum 10Ah per battery (if not running appliances while driving) <u>Cold Cranking Amps (CCA) Recommendation:</u> Maximum 800CCA per battery. Higher CCA rated batteries may be used if the 24V(+) wire from start-batteries to RS30 is >4m long and <5.5mm ² conductor size (AWG10 or smaller). See Installation Notes in Installation section for additional information.
RS30 current consumption (while active and off-charge)	4mA
Charging Efficiency @ avg 5A charge	97%
Charging Efficiency @ avg 10A charge	95%
"24V" RV alternator output voltage when running	27.4V to 29.0V (required for charging house-batteries via RS30 unit)
RS30 connection3 input voltage	11V to 30V (for IGN-on status) < 3V (for IGN-off status)
RS30 connection3 input current	< 0.5mA (with IGN signal on)
24V(+) max input current from start-batteries / alternator	Max 35A for up to 10 seconds
Fuse rating (Batt1+ and Batt2+ on RS30 rear side)	25Amp automotive ATO type. To avoid risk of serious damage, fuses must be replaced with correct fuse type and rating

Conditions enabling switching in/out of Charging mode:

Note: "IGN input" means connection3 of RS30 rear connections

IGN input "High" status requires 11V to 30V. IGN input "Low" status requires below 3V

	IGN input	12V(+) OUT	24V(+) IN	Notes
Switch into Charging mode when Either:	High	n/a	> 25.5V	Equivalent to >12.75V per house-battery
Or:	Low (not used)	n/a	> 27.2V	Equivalent to >13.6V per house-battery
Switch out of Charging mode when Either:	was High, now Low	n/a	n/a	Goes off-charge irrespective of battery voltage
[if IGN input was High when going on-charge]	High	n/a	< 25.0V	Equivalent to <12.5V per house-battery
Or:	Low (not used)	n/a	< 25.9V	Equivalent to <12.95V per house-battery
[if IGN input was Low (not used) to go on-charge]	Low (not used)	< 12.9V	< 26.2V	
Or:	Low (not used)			
[if IGN input was Low (not used) to go on-charge]				

7. Trouble Shooting Guide

Problem	Possible cause(s)	Solution(s)
<p><u>While RV engine is not running:</u> Voltage display LEDs flash and alarm sounds</p> <p><i>Note1: 12V lead-acid, SLA and AGM batteries can be degraded or damaged if voltage is kept below 12V or above 15V for long periods.</i></p>	<p>House-battery voltage is too low or high (refer to Alarms section)</p> <p><i>Note2: When RV engine is off, both house-batteries are connected in parallel by the RS30. Therefore both house-batteries will have the same voltage</i></p>	<p>If flashing display LEDs are indicating 11.8V or lower, house-battery voltage is low. It is recommended that loads are switched off and batteries charged.</p> <p>If all voltage display LEDs are flashing, house-battery voltage has been over 15.1V for more than 1 minute which can damage 12V batteries. Remove charging source</p> <p><i>Note3: 3-way or 2-way fridges (running on 12V supply) draw 10 to 15 Amps and will flatten house-batteries quickly without engine running.</i></p>
<p><u>While RV engine is running:</u> RS30 Charging LED blinks off for ½ a second then back on and internal relay clicks are heard (repeats continuously every 5 seconds or less).</p> <p><i>Note: This operation is normal, it is part of the house-battery equalisation process. It may occur as often as every 20 or 30 seconds if 12V appliances are drawing power. If it occurs every 5 seconds or less, then this section of trouble shooting guide should be followed.</i></p>	<p>12V appliance loads are too high</p> <p>Or house-battery condition is poor</p> <p>Or house-battery size is insufficient for the 12V appliances that are being run while engine is running</p> <p>Or wire gauge is too light for start-battery and/or house-battery connections to RS30 (in particular: long-run wires)</p>	<p>Switch off high-drain appliances (ie.12V fridge)</p> <p>Or upgrade house-batteries if high-drain appliances do need to be run while driving RV (minimum 100Ah capacity per house-battery).</p> <p>Or you may operate the RS30 continuously in this manner (not recommended) - there is a risk that due to quick voltage cycling, house-batteries may become degraded and appliances also may not operate correctly</p> <p>Increase wire gauge for RS30 connections to: house-batteries, start-batteries, GND.</p>
<p><u>While RV engine is running:</u> RS30 switches in then out of charging mode (Charging LED on for a few seconds then off for a few seconds repeatedly).</p> <p><i>Note: RS30 sounds a short beep each time it goes into charging mode</i></p>	<p>House-batteries are heavily discharged causing start-battery voltage to dip when RS30 goes into charging mode.</p>	<p>Connect IGN signal to RS30 connection3 (see Installation Notes in this manual)</p> <p>Or charge house-batteries (using mains battery-charger / solar etc) prior to starting RV engine.</p> <p>Or turn off RS30 (using Battery+Fresh buttons), run RV engine for 5 minutes at over 900rpm to charge start-batteries, turn on RS30, keep running RV engine at over 900rpm until RS30 successfully stays in charging mode (Charging LED on)</p>

Problem	Possible cause(s)	Solution(s)
Grey water meter reading low when water is present in the tank	Grey water is particularly clean	Add ½ teaspoon of salt into grey tank (wash salt down sink/basin/shower drain). <i>Note: Grey water meter sensitivity is set low to avoid false-reads from dirty/fouled tank sensors</i>
Water meter(s) reading water is present when tank(s) empty	Water tank sensors are particularly dirty/fouled	Remove tank sensors from side of tank, clean, reinstall.
Power LED and Charging LED flashing together, alarm sounds	RS30 fuse blown Or, poor connection to house-battery	Replace blown fuse(s) 25Amp ATO type at rear of RS30 unit. Check connections to house-batteries
House-batteries not charging (no voltage increase) when engine is running and RS30 Charging LED is on	RS30 fuse blown Or, poor connection to house-battery	Replace blown fuse(s) 25Amp ATO type at rear of RS30 unit. Check connections to house-batteries
RS30 fuses blow frequently	House-batteries CCA (Cold Cranking Amps) rating is too high and the high charge current exceeds fuse rating	Upgrade to RVtechnic RS60 60amp Dual Battery Charge Equaliser Or, change house-batteries to lower CCA rating. Recommended for RS30: 800CCA or lower per house-battery
	Or 12V appliance loads exceed fuse rating	Reduce appliance loads
	Or Spanner handle or other tool is shorting to vehicle chassis while making/removing battery connections	Avoid shorting tools to vehicle chassis, use insulated tools during installation/removal of RS30 and batteries
After starting/stopping RV engine, RS30 takes a long time to switch in/out of Charging mode	Start-battery voltage is slow to increase/decrease after starting/stopping RV engine. (possibly due to large capacity start-batteries)	Connect a switched ignition signal to RS30 connection3 (11V to 30V when IGN is on, zero volts when IGN is off). See Installation section for more details
All voltage display LEDs flash and alarm sounds while RV engine is running and Charging LED is on	Engine alternator / 24V solar controller output voltage exceeds 30.2V (exceeding 15.1V per 12V battery)	Repair or replace alternator / 24V solar controller <i>Note: To protect house-batteries the RS30 automatically switches out of charging mode after 1 minute of this over-voltage condition</i>

8. Warranty Information

Before calling for service or assistance please carefully check the Troubleshooting Guide and Installation information contained in this document.

1. In this warranty:
 - (a) "RVtechnic" means RVtechnic Ltd NZBN: 9429030541535;
 - (b) "you" means the purchaser of the Product not having purchased the Product for re-sale, and "your" has a corresponding meaning;
 - (c) "Product" means the RVtechnic product purchased by you accompanied by this document;

2. RVtechnic issues this limited warranty to the original purchaser of this product. This limited warranty is not transferable. The warranty applies to manufacturing faults and material defects for 2 years from the date of purchase.
The purchaser must return the product for inspection together with the receipt of purchase to either the retailer if purchased from a retail outlet, or to RVtechnic.

3. RVtechnic is not liable in the following situations (which are not exhaustive):
 - (a) the Product is damaged by:
 - (i) accident
 - (ii) misuse or abuse
 - (iii) normal wear and tear
 - (iv) incorrect power supply
 - (v) incomplete or improper installation
 - (vi) incorrect, improper or inappropriate use, application or operation
 - (vii) insect or vermin infestation
 - (viii) failure to comply with any additional instructions supplied with the product;
 - (b) the Product is modified without authority from RVtechnic in writing;
 - (c) the Product's serial number or warranty seal has been removed or defaced;
 - (d) the Product was serviced or repaired by anyone other than RVtechnic or an RVtechnic authorised repairer.

4. RVtechnic will, at its sole discretion, either (i) return the Product to you if it is not determined to be defective, or (ii) without regard to whether or not the original Product is determined to be defective, either (A) provide you with a replacement product of the same or comparable model, or (B) provide you with a refurbished or repaired Product

5. To the extent permitted by law: (a) RVtechnic excludes all warranties other than as contained in this document; (b) RVtechnic shall not be liable for any loss or damage whether direct or indirect or consequential arising from your purchase, use or non-use of the Product.

For service, please email: service@rvtechnic.co.nz

Or call (in NZ) 021-1542255, (outside of NZ) +64-21-1542255

For further contact details go to our website: www.rvtechnic.co.nz