

# Battery Management Dramas Solved



"By further developing and then combining an RV's vital electrical sub-systems, they have produced a product that is a lot more than the sum of its parts".

by Collyn Rivers "at the office"

Issues can arise for owners and auto electricians where solar is used to supplement alternator charging and, even more so if such sources are used to charge auxiliary batteries that may be located twenty or more conductor metres away – and usually of types that require a different charging regime from that of the starter battery.

If both solar and alternator charging are paralleled, they mutually interfere: the regulator of each tends to mistake the voltage signal from the other for the battery reference voltage needed to set their rate of charge. In reality this usually does not matter. The constant voltage regulation of the alternator tapers down charging from around 13.something volts

anyway, but the solar's more or less constant current output keeps boosting and/or absorbing until the battery reaches 14.7 volts plus. If, in that process, the solar modules are shaded, solar charging drops and alternator charging picks up again. It's more entertainment than trouble, but tends to send those owners actually aware of it into frenzies of unnecessary concern.

As noted above, this becomes more complicated where the auxiliary battery is a gel cell or AGM, and/or with charging regimes different from that of the starter battery.

Problems also arise where backup mains charging is needed because most of the multi-stage units that are

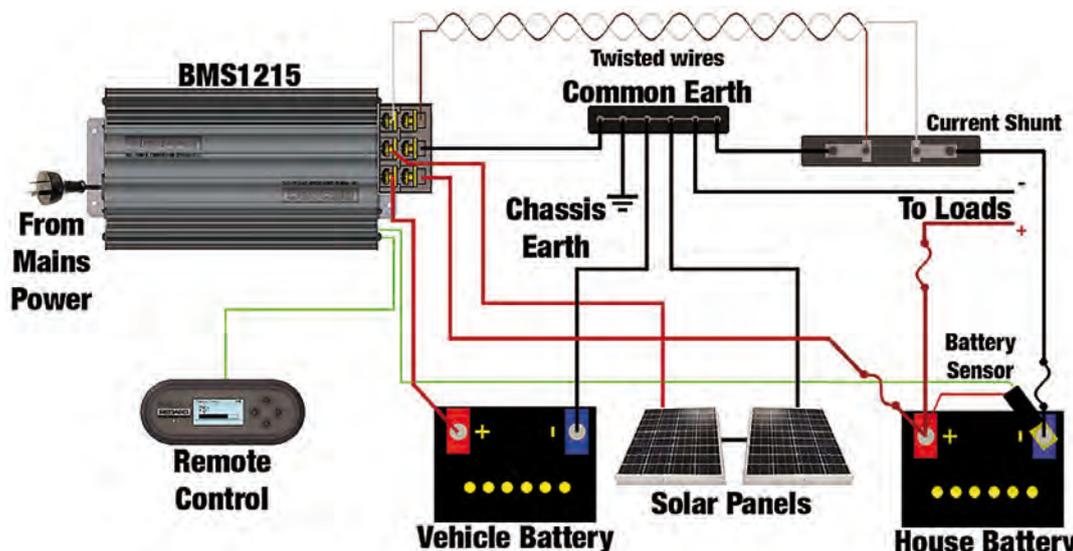


needed to charge efficiently anyway are tossed if an ongoing cyclic load (like a fridge) runs at the same time. Many such chargers revert to boost every time this happens, causing overcharging and resulting in fluid loss and damage to the battery.

Caravan batteries may be twenty 'conductor metres' away from the vehicle alternator, and often with a volt or more voltage drop in between. Various companies tackle the voltage drop problem via dc-dc converters that accept whatever comes down the supply cable and dc-dc converts it to around 14.4 volts – but whilst constant voltage charging works well enough to vaguely charge a starter battery, it does not do the same for conventional deep cycle batteries. These devices address part of the problems but cannot provide a full solution.

Much of the above has been recognised and addressed in various ways by Anthony Kittel and his talented techos at Redarc Electronics. Now however, they (and I) believe they have a solution that solves virtually all of the above problems in one main unit.

The breakthrough, I gathered



**Touring – three stage charging process** will charge your battery whilst you are on the road travelling or on location enjoying the freedom.

**Storage – five stage charging process** designed to safely maintain your battery whilst your caravan/camper/boat is in storage.



from spending time with Anthony and his senior engineers early last year, evolved from combining thinking from four or more areas.

Firstly, there was the realisation that where electrical problems occur (particularly in vehicles), they relate mainly to connections - rather than failure of components.

Secondly, and especially with RVs, it was known that problems may arise where devices work fine if used alone, but may be mutually less than compatible when interconnected. (A prime example is some gensets when used with some switch mode chargers. Either works fine alone, but may not work well – or even at all if used together).

Thirdly, and as motor vehicles have proved for well over 20 years, correctly designed and competently made electronic equipment is astonishingly reliable. Cars that are far more complex electronically than Moon landers may run for a decade or more without computer faults.

Fourthly, because all the bits must work harmoniously together, by definition, incompatibilities cannot exist in the final product, (an obvious benefit for vendors and installers alike).

The result of that thinking, plus a huge amount of research and development is the just released system described below.

The Redarc Smart Start® Battery Management System.

Managing Director, Anthony Kittel, told AEAC News, “the Smart Start® Battery Management System combines five functions in one main unit: a 240-volt (very) smart charger, a solar regulator with MPPT, a dc-dc multi-stage charge system, a start battery isolator, and a remote battery monitor.

“Its huge benefit, for both installer and users”, stresses Mr Kittel, “is that, once set up, it automatically selects the appropriate charging source. No input is needed from the user”.

Unlike most dc-dc charging systems, this system’s dc-dc conversion enables the Battery Management System to charge fully and efficiently. It works best when located close to the auxiliary battery to be charged and connected to the distant start battery by adequate cabling. “That’s the ideal of course”, says Mr Kittel, “but Redarc accepts that not all installs will be like that”.

To cope with the above, the inbuilt far-end dc-dc conversion has been designed to cope with the extraordinary drop of 3.0 volts (i.e. a mere 9.0 volts or so input) yet still draws only 20% or so more power to compensate. “The unit is still able to fully charge”, emphasises Mr Kittel, “It’s just that bit less efficient” - in terms of energy drawn.

“We set out to design a fully integrated Battery Management System that

incorporated all the charging possibilities in one module”, commented Redarc’s Project and Technology Manager, Mr Michael Paay. It may, and no doubt will, be argued that if one part fails, other functions may be lost as well. In practice however the most common problems are with interface connections – and if one of those fails, that tends to affect the overall system anyway. “By reducing the number of interconnects, the result is both statistically and practicably less likely to fail,” stresses Mr Paay.

Unlike many even locally made products, the new Redarc unit reflects its fully Australian heritage. It even acknowledges it gets very hot here at times. All units are therefore provided with an automatic battery temperature sensor that modifies the charge rate to suit – and also doubles as a safety cut-out in the event of extreme battery temperatures.

The unit comes complete with a (unusually but usefully large) Remote Monitor that connects via a telephone cable (RJ12). It is especially well thought out, providing comprehensive system performance (including a 30-day log) presented in a manner that auto-electricians will find invaluable – yet is understandable by non-technical users. Even the handbook is readable!

The initial unit is intended for 12 volt systems and produces approximately 15 amps, but further units are planned with

outputs up to 50 amps. A 24 volt unit will also be produced.

The Smart Start® BMS is both designed and manufactured in Australia. It has achieved Australian Safety & EMC approvals and meets ISO9001 quality and ISO 4001 environmental standards. It is backed by a two year, no fuss warranty. The product will be released in Australia & New Zealand in July 2009. The RRP is\$ 1595.00

## Export

Mr Kittel told AEAC News that Redarc is actively seeking to supply the European market, and is currently investigating opportunities in France. Market research has identified that, even three years ago, there were well over one million motorhomes in Europe – and that does not include caravans or fifth wheelers!

## On Trial

I have one of the very first in my 4.2 litre TD Nissan Patrol. As you (hopefully) read this, my wife (Maarit) and I will be somewhere west of Oodnadatta, heading for the Gunbarrel Highway across WA on our way home to Broome after a week’s stay at Maleny – north of Brisbane. That’s some 5,000 km of corrugation each way– not a bad trial.

Collyn is the author of various books in the above and associated fields. They include: Motorhome Electrics, The Campervan & Motorhome Book, The Camper Trailer Book, Solar That Really Works, and the recently published Solar Success. Collyn’s main website is: [www.caravanandmotorhomebooks.com](http://www.caravanandmotorhomebooks.com)