

The Benefits of Sterling's Advanced Alternator Regulators

The main problems with all standard advanced regulators are:

1. Relatively difficult to install. This prevents semi skilled personnel from fitting this type of unit.
2. Requires the removal of the existing alternator to work on it. This is not always easy to achieve and can add many hours of awkward work to an otherwise simple installation.
3. Requires extra cables to be run on the boat or vehicle. Again this can appear a simple thing, until a few hours work is required to pass a cable through a bulkhead or some other difficult place.
4. Warranty on new engines. Some engine / vehicle dealers raise warranty issues if a new alternator is modified to fit an advanced regulator with this product the alternator is not tampered with.
5. E.C.U. problems. Many new systems have E.C.U.s (electronic control systems) on their engine management systems, any attempt to fit an Advanced Regulator will result in alarms going off (mostly in vehicles and motor homes; this trend may work its way into the marine market). This new system ensures the main vehicle/boat voltage remains within the E.C.U.'s programmed parameters and allows the extra battery bank to be charged at the higher voltages needed to achieve fast charging.
6. Total Package. 95% of installations using an Advanced Alternator Regulator also have some sort of split charger system. This product already has this split charge system built in to it.

How do we do this?

Well, in theory, it is very simple. With an advanced regulator which connects to the alternators regulator, we override the standard alternator regulator and we push the alternators voltage up to increase the voltage at the batteries. This results in a massive charge improvement at the batteries.

With the voltage amplifier we do the reverse. We put a load on the alternator to pull the alternator voltage down. This fools the alternator into thinking that there is a major drain on the system and as such the standard regulator works at full current. However, the voltage is pulled down to a totally useless voltage for charging batteries. So the new system takes in this high current, but low voltage and amplifies the voltage to charge the auxiliary battery bank at a much higher voltage than the base system voltage. In order to achieve the fast battery charging, the software control program and settings for this product are the same as for our Digital battery chargers and the Digital advanced alternator regulator.

When would I use a Digital Split power amplifier as opposed to a Digital Advanced Alternator Regulator?

1. If you are a boat builder or vehicle builder and labour costs are a critical issue then this unit wins hands down. It requires only one extra wire (a negative) to the unit, the other power cables will already be standard. The only wires required for this unit are the alternator in and domestic + engine battery out.
2. If you are worried about the time and effort that it takes to fit an advanced regulator, then this unit will win. If you already have a split charger diode installed then the fitting for this unit will be about 15 minutes.
3. If you have a voltage sensitive base platform (i.e. a car or van with a E.C.U. with high voltage alarms) then this is a must.
4. If you have warranty issues with a new engine, then this unit simply does not touch the alternator, as a result there is no warranty conflict.
5. If you are worried about finding a competent electrician abroad, or concerned about the fitting costs of an advanced regulator, then this is the solution. Trust me, even you can fit this thing.

What does this new product do?

This new product incorporates a split charger diode system to charge 2 battery banks. However, on the domestic battery bank only, there is a unique power amplifier on this channel. This ensures the alternator works at its maximum output (it could also be used on a single output battery charger or other current limited power source) and increases the voltage of the domestic line (with software digital control) up to 14.1 volts for AGM, 14.4. for gel and 14.8 for open lead acid/traction. Using the same advanced program in the very successful Digital Advanced Regulator. (For performance improvement graphs, see the [Advanced Digital Alternator Regulator section](#).)

What other uses for this product?

This product could be used on any other product which has current limit on it. For example, if you have an old fashioned constant voltage transformer based battery charger (or a constant current with low preset voltage controls and poor trimmer performance) which does not work very well, then simply attach this to the output of the old battery charger and you will have the latest digital controlled 4 step charger, with all the programs, remote control and split output of the latest chargers on the market. Plus, at least a performance increase of about 500% (charger must not exceed the current rating of the device purchased).

Extra features built into the system for use if required

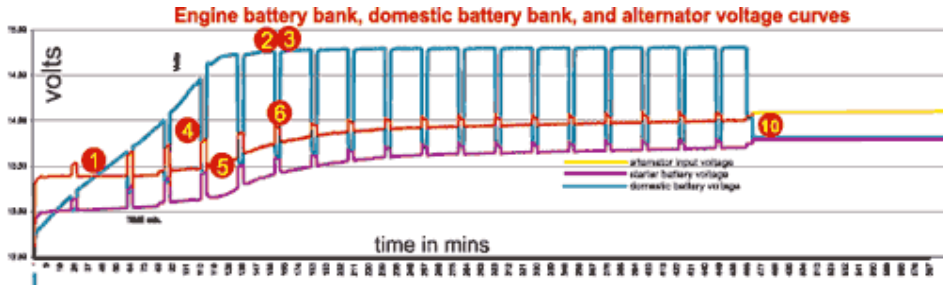
1. Battery temperature sensing.
2. Alternator temperature sensing. This disengages the unit in the event of the alternator temperature getting too high, it then re-engages the unit when the alternator cools down.
3. Battery sensor. The system battery sensor is built into the unit and is connected to the battery out terminal. However, an extension cable can be fitted to sense the voltage at the battery, thus improving the performance slightly in the event of long cable runs.
4. Ignition start. Some alternators require a voltage on the alternator to start up. A split diode will prevent such an alternator from working. However there is a built in device to overcome this problem in the event of such an alternator type being used.
5. The remote control. This offers full set-up information, plus voltages and temperatures of all the relevant places, as per the digital alternator regulator.
6. Current measurement. This unit, as standard, does not measure current. However if the optional extra pack is purchased it comes complete with 2 x pre wired shunts which enable 2 currents to be monitored and the third current to be derived from the first two using the in-built software. This enables the three currents, alternator output, domestic battery bank supply current and engine battery bank supply to be measured.

The end package is a very simple and easy installation with all the performance and safety features of the most expensive Advanced Alternator Regulators, but with an extremely simple and convenient installation method.

What do I expect to see from this unit and why?

The below test was set up and monitored and is as close as possible as to what happens on the average split charger system, the engine battery is a 100 amp hour standard lead acid and the domestic battery is 3 x 100 amp hour standard lead acid. The engine battery was discharged to 11 volts (about 10 engine starts) and the domestic bank to about 11 volts (will no longer run an inverter and is about 60% empty). The alternator used is a Bosch 90 amp with a standard 13.9 volt (variable) regulator. The unit battery type is programmed to open lead acid. There are 2 graphs, one is the current into the batteries and the other is various voltages on the system.

System voltage graph

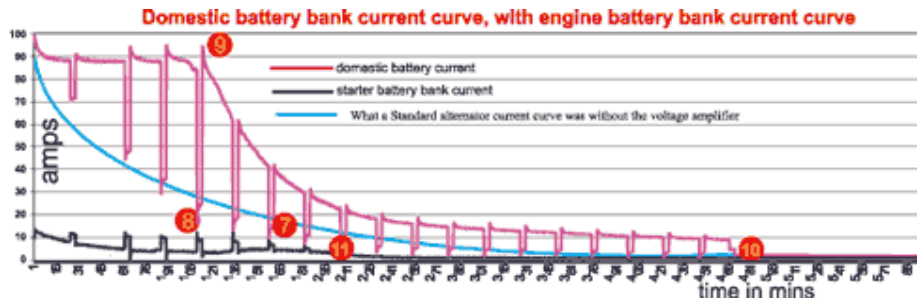


The key points to pick up on here are:

The yellow trace (alternator voltage into the unit) clearly shows the system doing its job: it is designed to pull this voltage down a little to enable the standard alternator regulator to produce its full current, you can clearly see that on position 4 on the voltage curve the voltage is pulled down to position 5, the result in current change is from position 8 – 9 which is about 70 amps improvement. A good increase in current. Position 1: the interesting point here is that this is the magic point, the point where the domestic battery voltage exceeds the alternator input voltage, this is what the process is all about.

The steps on the graphs show the unit boosting every 15 minutes then resting for 2.5 minutes. An example of this is the time period between 2 and 3. What you can see here is that by switching off the amplifier (to help the engine battery charger more) the engine battery voltage increases during that step shown at point 6 which results in extra current going into the engine battery at position 7. The current reflection of this process is reflected in other graph marked the current graph.

The current graph



This shows the current flow into the engine start battery and the domestic system. The effect of the amplifier can be clearly seen when the unit switches off for its 2.5 minute rest cycle, the current drops from position = 95 amps to position = about 30 amps, a 300% difference. At the same time you can see extra going into the starter battery which

clearly charges through the whole exercise.

On completion the unit switches off and the process continues as a conventional split charger system 10, if however the domestic battery falls below 12 volts the system will auto restart and continue the process again. 11 shows the engine battery is full and taking no more current. All the engine battery needs have been catered for by the software.
