DC to AC Inverters - Automatic Battery Chargers - Combined Inverter / Charger
Advanced Regulators - Alternator to Battery Chargers, MPPT solar regs
Battery to Battery Chargers - Galvanic Isolators - Voltage sensitive relays - Water proof DC-DC converters ,Accessories and Components

English ver

STERLING POWE

Advanced Marine and Automotive Power Products

Please download the most up to date product information data from our website. Due to the active nature of our research and development team, new and exciting products are constantly being added to our inventory. We appreciate you understand the constraints of an annual catalogue.

from Novembe

Introduction

About us?

Sterling Power Products is a small company owned by myself, Charles Sterling. I started out as a Marine Engineer Officer trained by British Petroleum, and worked on Super Tankers. This was a great experience; it was a little boring as these ships were new and never really broke down (they exploded the odd time but apart from that they were very reliable). So I left, and joined Canadian Pacific where I spent my time on container ships, ore carriers and other more interesting ships (more interesting from the engineering challenge point of view as they tended to be older, and therefore broke down more often). I did the running round the world thing and got into all the trouble you can imagine (ah, the good old days). I was one of the youngest people ever to hold a full seconds diesel (D.T.I.) ticket (steam and diesel) with part A and part of part B of a chief engineers ticket. But I was reluctant to spend my life running round the world from what appeared to be, one war zone to another, and where ones belief in god is directly proportional to how close that last bullet was to your head.

I have always claimed to be a reasonable engineer, and as such, try to convey not just what a product does but why you need it. I endeavour to make this as simple as possible. Please bear in mind that I answer about 90 calls a day, and have targeted the literature at people who want to understand the products, but have been unable to get access to the information. Most companies' technical information is hidden in the sales jargon, not with Sterling. We are proud of what our equipment does and see no need to cover up any flaws with glossy vague sales literature. Flaws should be designed out of products, not covered up. All companies products suffer from technical problems, the trick is to find them and design them out as quickly as possible. Being a small company with its own in house design team, our response time is at a level that larger competitors can only dream about. The end result is our products just keep getting better and better, outstripping our competitors more and more every year.

Sterling Power Products business plan is very simple. We design every conceivable performance and safety feature we can think of into our products; then we check our competitors just in case we missed something (however, we have never come across anything close). Having designed all the features we try to manufacture the products at a cost that will allow us to offer our customers a product with a high technical specification, but at the same time keeping the cost down. This is especially important when dealing with O.E.M's (Original Equipment Manufactures, in our case boat builders). Builders want performance /safety/reliability but uppermost is price.

Technical help: At Sterling I know we have an extremely good technical help line, we try to help all our customers with good technical advice, however, 9 times out of 10 when a customer feels he has a defective product the fault is in the installation or operation of the product , as a result, when you phone the technical help line there are only 3 things we are interested in, voltages, voltages, and voltages. With voltages we can help you. This may sound blunt but we are here to help you and with voltages we can.

New investment if latest warehouse management and stacking has enabled us to release 40% extra warehouse space for more stock allowing us to remain in our factory in Droitwich for a few more years

Contents

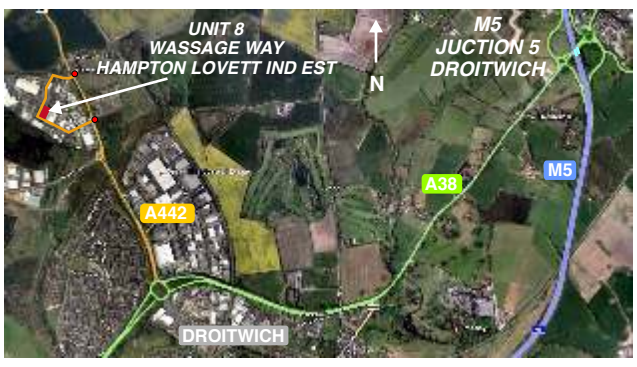
Over £ 11,000,000.00 retail stock held at any one time ensuring product availability and speed of delivery.

www.sterling-power.com

grid ref: 52 17 06.03 N
2 10 14.37 W

Post Code: WR9 0NX

Droitwich, England

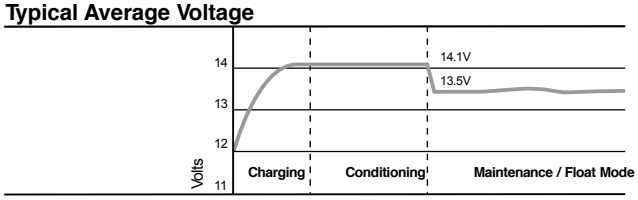


WATERPROOF and SALTWATER TESTED IP68

Pro Sport 5 and 5/5 (10)

Totally waterproof (IP 68) , 3 stage Battery Charger

Typical Average Voltage



Pro Sport 5 is 1 x 12V / 5A output
Pro Sport 5/5 is 2 x 12V / 5A totally isolated outputs, can be used as 1 x 12V / 10A, 2 x 12V / 5A, or 1 x 24 v / 5A
Epoxy filled for waterproof and vibration proof aspects
Pre-wired with 1.5 meters d/c and a/c cables
d/c cables pre-fused and comes with gold plated ring terminals.

AQUANAUTIC Waterproof range

Pro Sport 5 and 5/5 waterproof battery charger 230V a/c 50 Hz only

Voltage d/c	Amperes	Outputs	Size L x W x D mm	Weight kg	Part no
12	5	1	75 x 150 x 65	2.5	PS125
12/24	12V (2 x 5A) / 12V (1 x 10A) or 12 V 1 X 10 amp	2	230 x 130 x 90	3.5	PS1255

AQUANAUTIC Waterproof range

Power Factor Corrected (PFC)

110-230V a/c auto 40-70 Hz

*read benefits of PFC on page 4**

WATERPROOF and SALTWATER TESTED IP68

Includes fused wires w/ 8mm ring terminals

12V / 8 - 20A
24V / 4 - 10A

Waterproof Aquanautic PFC 110-230V auto

Voltage d/c	outputs	amps	Size L x W x D mm	Weight kg	Part no
12	1	8	180 x 170 x 65	2.5	PSP1281
12 & 24	2	8 at 12V 4 at 24V	180 x 170 x 65	2.5	PSP1282
12	1	12	200 x 170 x 65	2.8	PSP12121
12 & 24	2	12 at 12V 6 at 24V	200 x 170 x 65	2.8	PSP12122
12	1	20	290 x 170 x 65	3.8	PSP12201
12 & 24	2	20 at 12V 10 at 24V	290 x 170 x 65	3.0	PSP12202
12 & 24 & 36	3	20@12V 10@24V 6@36V	290 x 170 x 65	3.2	PSP12203

1A Float charger

Ideal for
jet skis, small boats,
bikes, lawn mowers etc.
single output.

1A Float Charger

Volts	Amps	Size L x W x D mm	Weight kg	Part no
12	1	60 x 60 x 60	0.5	121CE

AQUANAUTIC Waterproof range

Advice: We recommend to use waterproof battery chargers where the waterproof aspect is a priority. For all other applications we recommend our digital control units (please refer to page 4) which are lighter and have a superior performance.

1 amp	Pro Sport 5-55	Pro Sport PFC	
●	●		Molded Plastic case
		●	Extruded aluminium housing.
●	●	●	Ignition Protected
●	●	●	Fully waterproof to (IP 68) standard .
	●	●	Both pos and neg fully isolated that enables the unit to charge 12 or 24V batteries.
	●	●	Adaptive charging, ensures max charge in the batteries.
		●	Lead acid / sealed (AGM/Gel) battery selectable for maximum performance
●	●		Preset fixed non selectable battery type for gel, sealed, AGM, and open lead acid
●	●	●	Dynamic thermal output control. Reduces power rather than over heat
●	●	●	LED power and charge indicators.
●	●	●	Built-in protection distributed-on-demand. Power Pack mode
	●	●	3 stage charging curve.
●	●	●	Pre-wired waterproof loom for easy installation.
●	●	●	Pre-fused and gold plated terminals
	●	●	12 and 24V application (except Pro Sport 5)
	●	●	2 -3 x isolated outputs (except Pro Sport 5)
		●	110 & 230V a/c auto

ProCharge Ultra

- Power Factor Corrected - Power Pack

Sterling
Global operation

Awarded Premium Product from SAILING TODAY

UK magazine:
Sailing Today

2011 PITTMAN INNOVATION AWARD

USA magazine:
Sail

IP 22

2010 INNOVATION AWARDS WINNER

IBEX innovation award
Louisville, KT

12v 10 amp to 40 amp
24 v 20 amp

12v 50 amp & 60 amp
24 v 30 amp

Press release:
With our years of experience in this market everything we could possibly think of was combined into this product range, resulting in the **Ultimate Battery Charger.** However, do not take our word for it, this was recently confirmed on its first competitive test with **Sailing Today Magazine** where it won **Premium Product** against the toughest competitors (Mastervolt and Victron plus others). It was described as **"this has to be the most flexible marine charger on the market today".** Similarly, the **Pro Charge Ultra** won the innovation award at **IBEX Kentucky 2010**, the largest **I**nternational **B**oat building **Ex**hibition in the USA where the **Pro Charge Ultra** has been recently released onto the market.

IUoUo predictive
4 stage constant current

Safety Certified by: TÜV NRTL C US
To Standards: UL 1236 SB, CSA C22.2-107.2
EN ISO 13297 Small Craft Directive
NMMA CE ABYC RoHS compliant

What size of charger do I need?
Most companies recommend a battery charger to be about 10% of the amp hr capacity of the batteries requiring to be charged. However, if you have a gen set onboard and you wish to charge your batteries faster - to save fuel, then depending on your budget, you can easily double the charger size to reduce your generator running hours and achieve the charge faster.

Larger requirements?
After your final calculations are made and you require a larger charger then the Sterling range, because they are digital chargers, **can be added together**. For larger requirements simply add units (2-3-4 etc) together to meet your requirements. Multiple smaller units can offer some advantages over 1 larger unit: They tend to be lower cost, have a built in redundancy (in event of one failing) and enables you to switch one off in the event of low shore power facility.

Global Application
The **Pro Charge Ultra** will operate with AC voltages ranging from 80V-270VAC (40- 70Hz) and DC voltages of 130-320VDC.

Power Factor Correction
Power efficiency of the **Pro Charge Ultra** is significantly higher than its predecessors. The PCU runs at >90% efficiency and the power factor is rated at 0.99PFC this is in contrast to a non-PFC charger which runs at approximately 65% efficiency. Thus, the same power output with a reduced power input saving you money on kilowatt-hours. Other major benefits of PFC allows the unit to run off a dirty/modified/quasi sine wave from a generator (example). The other advantage of this technique is less heat is liberated during operation, therefore reduced use of fan.

Synchronized Rectification
Modern, synchronized rectification with MOSFET technology makes the **Pro Charge Ultra** Series 9% more effective. Less heat liberated and increased efficiency are also features of this latest technology. **Elegant yet functional design**

The **Pro Charge Ultra** housing was designed by a renowned American product designer. In the foreground stands optimal function and clean lines. The housing is made of plastic and the back is made of well protected metal plate with the latest corrosion coatings, all other metal fixture and fittings are stainless steel or non ferrous.

Splash protection
For vertical mounting, the unit has drip water protection. The protection class is IP22. It meets the requirements of the ABYC drip test.

11 preset charging algorithms & 1 custom set
The **Pro Charge Ultra** has 11 different charging characteristics for corresponding types of batteries: Gel, AGM, sealed, open, calcium, $LiFePO_4$. If these should not suffice there is 1 customizable setting which the user can set themselves - simply enter the absorption and float voltages then press enter and the settings save.

Automatic Desulphation / Equalization
Every 7-10 days the **Pro Charge Ultra** undertakes a desulphation / equalisation and anti-stratification program which keeps your batteries young and rejuvenated.

Voltage + Current LED display
2 LED matrix displays. The left matrix displays the voltage output from the charger and the right matrix displays the current leaving the charger.

Performance monitoring LED bar
A bar of LEDs display the percentage to which the **Pro Charge Ultra** battery charger is operating at. This is easily and quickly recognised at a glance and can be easily analysed.

32 LED display
32 LEDs built in to the front panel provides all the necessary information about the charger including: charging status, battery chemistry select, temperature and voltage warnings along with many others.

Redundant safety system
In the event of a failure of the processor provides another safety system to shut off the device. Doubling the levels of security.

Variable fan speed
The internal temperature of the device ultimately runs the speed of the fan. This guarantees a minimum possible noise.
So called ***'thermostatically controlled force draft cooling'***

Programmable power reduction
The **Pro Charge Ultra** can also charge with variable performance levels. The following performance levels available are: 100%, 75%, 50% & 25%. This can be controlled via the front panel or via programming the remote control. Power reduction is often used if the power supply to the charger is inadequate (e.g. small generator) but still enables competent levels of battery charging. Another benefit of power reduction is to reduce fan noise, as less heat is liberated.

Three isolated charge outputs (PCU 12V/10A has 2 outputs)
The **Pro Charge Ultra** has 3 isolated charging outputs. Thus, 3 batteries or battery banks can charge without the batteries themselves being interconnected, e.g. Starter, domestic and generator starter battery. If an output is not required is, then a bridge is required between the outputs.

Small, lightweight and powerful
The **Pro Charge Ultra** series is characterised by its very compact, low weight and small footprint structure. The 12V / 60A model only weighs

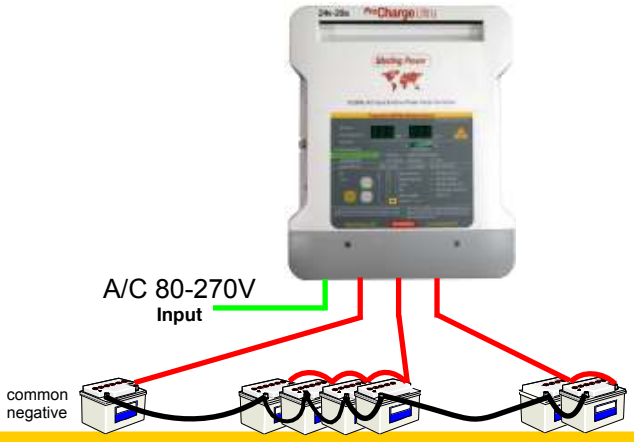
The Ultimate Battery Charger 3 output battery chargers PFC

Specification

110 x 68 x20 mm
including
10 metres of cable
Unique remote housing
can be surface mounted,
recess mounted or
flush mounted

New features on this product surpassing that of standard battery chargers include:

1) **11 pre-programmed battery curves including:** Open/Sealed lead acid, AGM, Gel, $LiFePO_4$.
2) **1 custom set,** can be set from charger, unlike our competitors there is no need for a computer to do this operation, all can be done from the front panel.
3) **2 x digital meters** for current and voltage measurement and a 32 LED information display.
4) **1 x power meter** to show what reserve power left in the unit.
5) **PFC,** active, up to 0.99 PF, ensuring efficient power conversion, up to almost 90% as opposed to about 60% for older, non-PFC technology.
6) **% power reduction** to allow unit to work with restricted power available (available on local control or remote control panel).
7) **De-sulphation** auto cycle built in to software.
8) New, low activity, standby mode to increase battery life.
9) Battery health program every 7-10 days .
10) **Multiple speed fan control.** This reduces unnecessary fan noise experienced by the customer, even though the new extreme efficiency reduces the need for fans. At high ambient temperatures (40-50 deg C), however, fans would still be required to ensure operation.
11) **Primary** (processor digitally controlled) and an emergency backup **secondary** (analogue controlled) high voltage trip.
12) 32 LED information panel to ensure maximum information transmitted to owner.
13) Internal scan and systems check to ensure product is okay.
14) **Remote control option.**
15) **Small footprint and light weight.**
16) Include battery temperature sensor to give temperature compensation and high temp trip.
17) As with all our marine chargers all metals used are non-ferrous or heavily protected, so no corrosion.
18) **New synchronised rectification** output as opposed to diode output, giving up to an extra 9% efficiency.
19) **Conforms to ABYC drip test**, is waterproof from water directly dropped on to the top of the unit (+/ - 17 deg) if installed correctly (vertically).
20) **Thermostatically controlled force draft cooling.**
21) The printed circuit boards are conformal coated for high humidity and salt air operations.



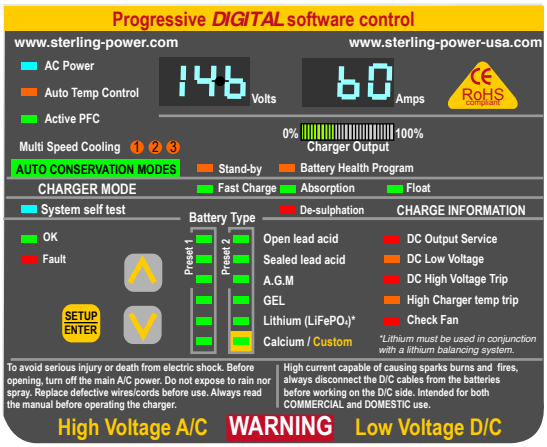
Pro Charge Ultra 80-270 V 40-70 Hz a/c input

D/C voltage	Amps	Number of outputs	Size L x W x D mm	Weight kg	Part nos
12	10	2	260 x 215 x 90	2.0	PCU1210
12	20	3	260 x 215 x 90	2.0	PCU1220
12	30	3	260 x 215 x 90	2.0	PCU1230
12	40	3	260 x 215 x 90	2.0	PCU1240
12	50	3	315 x 215 x 90	3.0	PCU1250
12	60	3	315 x 215 x 90	3.0	PCU1260
For larger current requirements simply add 2 or more units together.					
24	20	3	260 x 215 x 90	2.0	PCU2420
24	30	3	315 x 215 x 90	3.0	PCU2430
Remote control plus 10 metres of cable			110 x 68 x 20	0.05	PCUR

Remote Control (optional)

With the optional remote control can many features can be operated from a distance and all important information can be read. The Remote control can be used both as an installation or attached as a mounted unit.

Information from the remote control
- Charging voltage (V) and charge current (A)
- Charging stage and duration
- Configured Battery Type
- Temperature of the charger
- Temperature of the battery
- Error Messages



Pro Charge Ultra front panel

Local Information Center
32 x LED display panel
2 x LED digital meters
1 x digital power meter

12V / 60A model, all other units pro rata

Input voltage range	80-270V 40-70 Hz
Power Factor at 230V	0.976
Efficiency	90.4%
Full load current (110/230v)	9.8/4.6 amps
Total Harmonic Distortion	2.4% voltage
Total Harmonic Distortion	2.4% current
Ripple noise (R.M.S.)	14mV
Ground leakage	0.5 mA

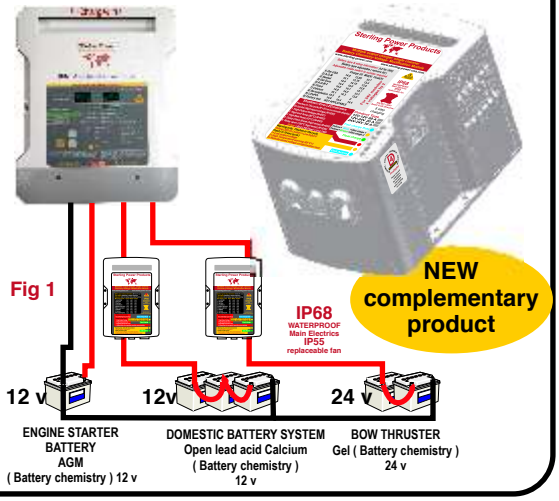
Generator/ mains power required to run unit (watts)

12 v	20 amp	approx	350 watts
12 v	30 amp	approx	500 watts
12 v	40 amp	approx	600 watts
12 v	50 amp	approx	750 watts
12 v	60 amp	approx	900 watts
24 v	20 amp	approx	600 watts
24 v	30 amp	approx	900 watts
voltmeter accuracy			+/- 1%
ammeter accuracy			+/- 1%

EN61000-3-2
EN61000-3-3
EN50081-1
EN60335-2-29

Battery Chemistry Module

You may have a requirement to mix you battery types (chemistry) ie AGM and Traction or voltages ie 12 and 24 v , in which case please look at our new range off **Battery Chemistry Modules** designed to simply add to this product and acheive the perfect battery mixture



Multi battery charging chemistry module

Convert a multiple output, single chemistry battery charger into a:
Multi Chemistry / Multi Voltage / Multi temperature sensing / Multi output / Multi remote sense Battery Charger

IP68

Battery Charger Chemistry Modification Module

Another great new idea from Sterling, Patent Pending: GB1204145.5

The problem

Most boats or specialised vehicles have multi-battery bank installations. This type of installation can cause problems if the battery chemistries in the installation are very different from each other (i.e. gel and open lead acid etc.) or the battery voltages may be different (i.e. you may have a 12V charger and require 24V for 1 battery bank (or vice versa). or even one battery may be 20 ft away from the charger resulting in massive voltage drop . A good example of this is a GEL battery bank for your starter battery bank and an Open Lead Acid battery bank for a secondary / aux battery system and a 24V lead acid sealed for the bow thruster. This causes a problem for most multiple standard output battery chargers as they can only be set to 1 battery chemistry type and 1 voltage. The usual thing is to set the charger to the lower voltage chemistry which in turn reduces the potential performance of the charge on the other battery banks with different chemistries plus damaging the battery bank. For example, you could have a GEL battery requiring 14.1V and 13.5V float but also an open lead acid bank requiring 14.8V charger and 13.5V float. Obviously, the 2 charge cycles cannot be archived at the GEL setting, the open lead acid battery bank will not charge at a high enough voltage and would end up sulphating the battery bank. This would result in premature destruction of the bank and a warranty failure on that bank as it was not charged at it's recommended charging curve. If the 14.8V range was used to keep the open lead acid batteries happy then the premature destruction of the AGM battery bank would be assured as they would dry up. The warranty for these batteries would then be forfeited for the same reason as explained before.

There are 2 key different technical ways to do this:

1) Switch each output on for a period of time and convert that output to a different chemistry setting and scan through the outputs. This method is simple but, in effect, is a poor solution because for example, if you may have 60A charger then you can only switch on 1 output during a time frame this supplies reduces power to full batteries but starves the empty batteries of the time they need to harvest the full charger power potential during that time span. The result is, for example, a large domestic battery bank and an engine start and bow thruster bank would result in the 60A only effectively being a 20A to the main domestic battery bank in that scanning time frame.

2) 3 individually adjustable outputs, this is, by far, the best and only totally effective way of achieving this, however, in effect, you have to add an expensive output stage controller to each output resulting in a massive price rise (over 2-3 times the cost of the standard unit). Its very unlikely that an OEM boat / vehicle builder would fit this type of product as standard due to the high initial purchase cost of such a unit.

The Sterling solution

The new Sterling module approaches this from the same angle as adding an output stage to each output. We effectively place in a box a voltage booster and the output stage from a digital charger. This means that the new device can be added to any of the output terminals of our Pro Charge Ultra **(or most other competitor companies multiple output charger).** This will allow the main 3 (or more) output charger to be set at the lower chemistry voltage for the likes of Gel, then, by adding the new Sterling Multi chemistry module to one of the outputs (must be connected to an output of a current limiting charger and cannot be connected direct to a battery (see fig 1 and fig 2). One can adjust that output to a totally different charging chemistry profile. The output voltage and charging curves are independent of the charger's input voltage. This enables a totally different chemistry to be selected, this gives all the advantages of the multi chemistry charger without the huge extra cost, and can be simply retro fitted to any multi output battery charger (within the limitations of the product).

Advantages of this product

1) Easy to install,
2) Fits our products and most of our competitors multiple output chargers or **converts a single output charger into a multiple output charger.**
3) 12-12V , 12-24 V , 24-24V and 12-24V models.
4) 8 selectable independent latest battery chemistries to chose from and a de-sulphation cycle, also LiFePO$_4$ cycle .
5) Battery temperature compensation and high battery temperature trip.
6) Remote battery sense compensate for cable voltage drop.
7) 6 LEDS projecting over 20 individual charge and warning information events.
8) Fail safe, reverts to basic charge function - about 1V less in event of a failure. Product can be replaced/repaired at convenience.
9) High battery temperature "daisy chain" trip (optional), so, every battery can be monitored and unit switched off, in the event of on battery overheating causing high battery temperature problem.
10) Ignition fed generator to link in with sterling Pro Split R alternator splitter, this allows the output to be further split.
11) Remote control available as optional extra.

Which model suits my needs. Ensure that your current charger's output is equal to or less than the rating of the product. I.e. a 12V 60A module can be used on any charger up to 12V 60A .

2 or 3+ output charger **How to use this product**

Typical example with 3 output charger

The Problem

Chemistry, attach 2 Chemistry modification modules to each of the other outputs, then set.

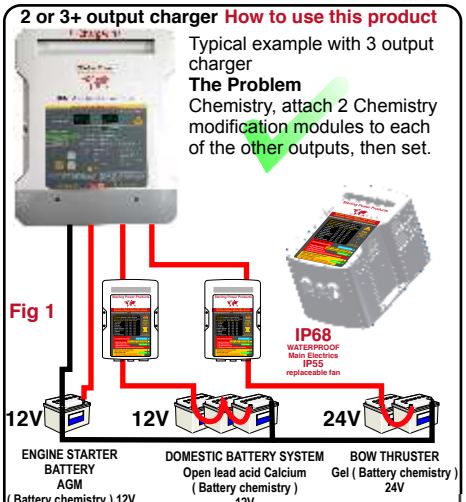
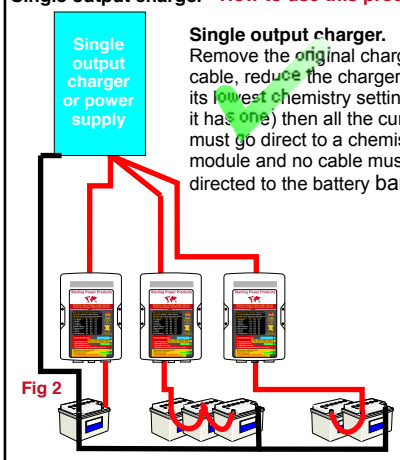


Fig 1

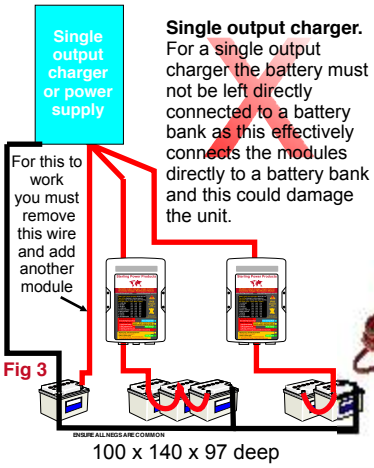
Single output charger **How to use this product**



Single output charger.
Remove the original charger cable, reduce the charger to its lowest chemistry setting (if it has one) then all the current must go direct to a chemistry module and no cable must be directed to the battery bank.

Fig 2

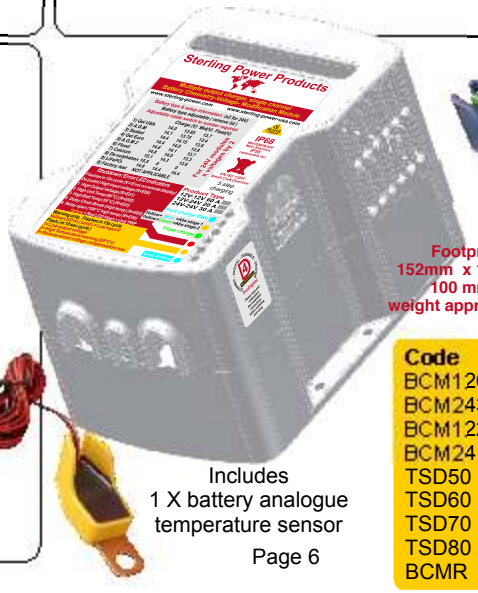
How not to use this product



Single output charger.
For a single output charger the battery must not be left directly connected to a battery bank as this effectively connects the modules directly to a battery bank and this could damage the unit.

Fig 3

100 x 140 x 97 deep



Includes
1 X battery analogue temperature sensor

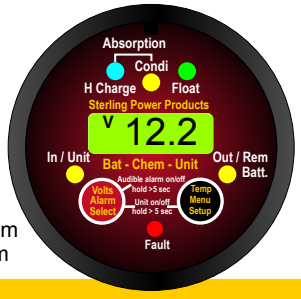
Will this product work on my multi output charger?

This unit requires there to be a live feed on the output terminal on the charger when switched on.

To Test. With the port in question connection point free of any cable and all other cables connected as per normal, simply check their is a voltage of 13V+ (or 26V+) on that output. If there is no voltage on that output when the charger is on then the product will not work.

Note: This is a new product and a new concept, we have undergone all the tests we can think off with our products and some competitors products. However, this product constitutes a whole new era for battery charging and, as such, we are always curious with what happens in the real word. On going to press we are not aware of any multi charger this product will not work on, however, obviously we don't know, nor have we tested, every multi output charger in the world, both past and present. Therefore, to avoid disappointment please check as above. If this unit is not compatible with any product then please email us and we are happy to make a list (if any) to assist our valued customers .

Optional
50-80 Deg C
daisy chain
digital trip



Footprint
152mm x 100 mm
100 mm height
weight approx 0.4kg

Remote
cut hole: 54 mm
total diameter: 68 mm
thread depth: 44 mm

Code	Description	
BCM1260	12V-12V up to 60A	*Max 60 amp 12V charger*
BCM2430	24V-24V up to 30A	*Max 30 amp 24V charger*
BCM1224	12V-24V 10A (at 24V)	*Current limiting any 12v charger*
BCM2412	24V-12V 20 amp (at 12V)	*Current limiting any 12v charger*
TSD50	50 deg C = 122 deg F	Digital temp sensor
TSD60	60 deg C = 140 deg F	Digital temp sensor
TSD70	70 deg C = 158 deg F	Digital temp sensor
TSD80	80 deg C = 176 deg F	Digital temp sensor
BCMR	Battery Chemistry remote control plus 10 m cable	

Battery Chemistry Module or a Battery to Battery Charger?
Main differences explained below:

The Battery Chemistry Module and the Battery to Battery Charger application are such a new and exciting field which opens a lot of previously locked technical doors. We feel we should dedicate a bit more time and space to trying to portray the aspects of this technology and point out the difference between the products and what other problems they may solve for you. The applications are truly endless: vehicle tail lifts, on board invalid wheel chair charging, boats, cars, commercial vehicles, the list goes on. Due to the space limitations of this catalogue we must pick a particular area and focus description to that area, the previous page clearly shows where you should use a battery chemistry module. The article below shows where the battery chemistry module stops and the battery to battery charger technology takes over.

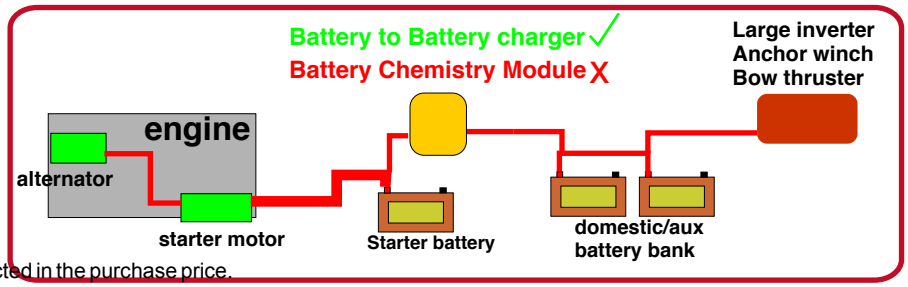
What is the difference between a Battery to Battery Charger and a Battery Chemistry Module?
There is 1 major difference and that is their ability to current limit. The battery to battery charger has full current limiting. The battery chemistry module has no current limiting ability (other than a fuse).

What is current limiting?
Current limiting is the ability of the product to internally limit the current which it will allow to pass through itself. This prevents damage to the unit and also allows total control of power through the unit. This is a great but expensive feature and accounts for a large proportion of the parts/technology and hence the extra cost in a Battery to Battery Charger as opposed to its lower cost cousin the Battery Chemistry Module.

Why does the Battery Chemistry Module not have current limiting?
The simply answer is it does not need it. As long as the product is used in conjunction with its design criteria there is simply no need for current limiting. I.e. we have rated the product to 60A continuous, then, as long as the current does not exceed 60A, the unit is okay. The best way to ensure that it does not exceed the 60A is to connect it to a battery charger which is already internally current limited to 60A maximum (or less). That way we rely on the already purchased battery charger's internal current limiting protection. This eliminates the requirement of that expensive electrical feature to be duplicated in our product, allowing us to substantially reduce the product cost to the customer.

Give me an example of why current limiting is important?
Let us imagine a simple standard setup where we have the engine alternator feeding the engine battery which is then charging the auxiliary battery. The auxiliary battery has a large inverter or anchor winch on it. To connect the starter battery and the domestic battery we have one system which uses a Battery Chemistry Module and the other system using a Battery to Battery Charger. Lets take the Battery Chemistry Module system and turn the engine on, chances are everything would be fine initially, the unit would fast charge the domestic bank, however, when the anchor winch or bow thruster is turned on, a high current (~200A) shall be pulled from the primary battery bank to the secondary battery bank. This shall exceed the rating of the BCM and the fuse will blow. The Battery to Battery Charger, on the flip side, has no problem with this, it simply says I can NOT give you 200A I am only giving you a maximum of 60A and that is it.

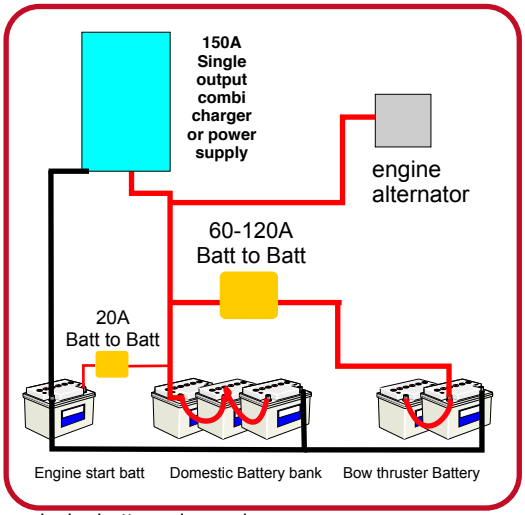
Battery chemistry module applications on previous page



What sort of cost savings are we talking about?
In the region of 30-40% can be saved in parts, this is reflected in the purchase price.

What aspects would I factor in to make a technical purchase decision between the 2 different products?
If the battery chemistry problem is confined to the mains battery charger only and the charger is 60A or under (at 12V) - The Battery Chemistry Module is the product for you.

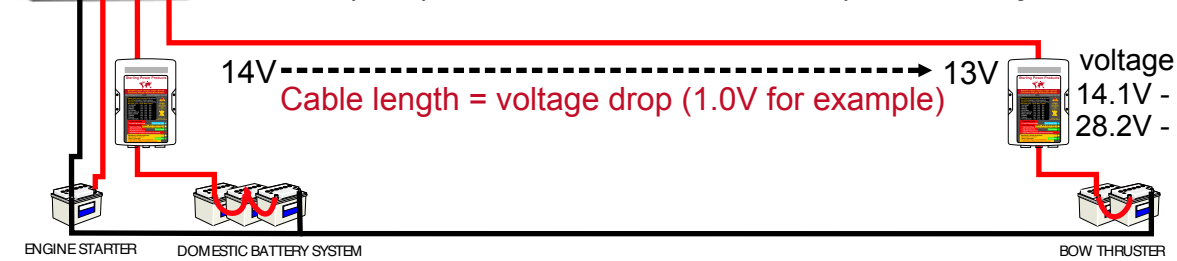
If you wish to cover the same problem from various charging sources: I.e. alternator and battery charging, in which case the current limiting aspect of the battery to battery charger will be the vital aspect to swing the product to the battery to battery charger.



Other reasons for looking at a battery to battery charger over a battery chemistry module.
You have a 150A single stage battery charger but want a different chemistry on a different battery bank, again think current limiting. You may, for example, have the main battery charger power going to your domestic battery bank (like a combi inverter charger) but, you may want to charge an engine starter battery. Then, only 20A may be required, so, our battery to battery 20A (BBW1220) charger will be more than happy even though it is exposed to a 150A + charger. It is happy because it current limits and does not care about the high current source.

Long cable runs

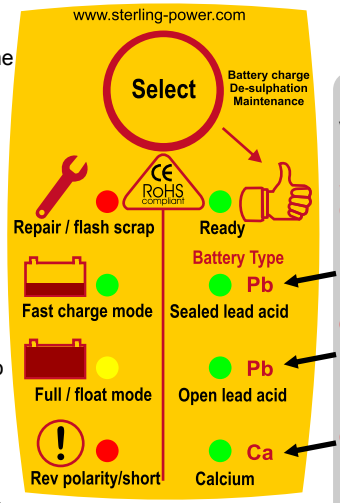
Another typical marine problem is where the bow thruster/anchor winch battery is a long way away from the charger. This results in expensive cable runs to try to compensate for large voltage drops. The Battery Chemistry Module can be placed close to the distant battery as it can accept a low input voltage drops (activates at 11.0V) but boost them up so the distant batteries can get the correct charging curve both from the point of view of chemistry profile but also voltage scale. For instance, you may a 24V bow thruster or anchor winch but only have a 12V charger.



voltage increased to:
14.1V - 15.1V profile dependent (12V
28.2V - 30.2V profile dependent (24V

Portable Global Smart Charger with auto repair program

Simple to use, easy to select different battery types and becomes a power pack when on float mode delivering full power if required (unlike our competitors who shut down the available power on float). This microprocessor controlled portable charger can be used anywhere in the world. The AC input voltages and frequencies can range from 100V-240V & 47-64Hz.



Easy to select battery type voltages x 2 for 24 v unit

Sealed lead acid
Gel and AGM
Max 14.4 v charge
Float 13.5

Open lead acid
14.8 v charge
Float 13.5

Calcium
15.1 volt charge
Float 13.5

Features and benefits of this portable charger are:

Universal AC Input (100V to 240V): can be used anywhere in the world, truly global charging.
Suitable for all types of lead acid batteries: Wet, GEL, AGM, Calcium.
Simple 3 touch screen selections with intuitive iconic LED indications.
Microprocessor control multi-stage charger with *pulse absorption* and *float charge*: Fast charge but safe full power floating for long term operation. I.e. if you want to work on a vehicle while charging the battery then no problem, after the battery is charged the unit will deliver up to 5A to run the interior lights, so, you can continue to work on the vehicle.
Checks if a battery is faulty. The processor can automatically identify if a battery is beyond repair and flashes a warning light to inform you it needs replacing.
Desulphation / Equilization. Repairs faulty batteries (if recoverable). If the battery is found to be faulty, but repairable, the unit will automatically identify the fault and inject high voltage and short DC pulses until the battery is repaired, an LED shows the charger is on repair mode.
Defective battery identification. If, after 8 hours on the repair mode, the battery is deemed unrepairable, then an LED will flash to inform you that the battery is beyond help and needs replacing.
Three charge modes. When the battery is found to be suitable for a charge then the charger will bulk charge, then pulse width absorption charge and finally float charge, the unit can then be left on permanently.
Soft start charging. If the battery is found to be heavily depleted then the smart charger will start at a low pulse current until the battery has reached a level where it can then absorb the full charge power
50% power reduction mode: For small batteries under 30Ah
Cold weather: 14.8V (x2 for 24V) charge mode option.
Two interchangeable connection leads with clamps and eyelet terminals.
Thermal control, regulates charge current in hot conditions.
No connection spark, there is no output voltage until the battery is connected.
Electronic reverse polarity protection with LED warning.
40 hours 'time out' to avoid any possible problems.
Short circuit protected.
Thermal protection, reduces power and switches off if too hot.

8 LED information panel

Specification AC input range 100-240V

AC frequency 47-64 Hz
Full load 1.3A@230V AC
Max power 70W
Optimum Efficiency >81%
Max DDC current 5A
Charge voltage for sealed battery 14.4V x 2 for 24V
Low temp/calcuim mode 14.7V x 2 for 24V
Float mode high level 13.5V x 2 for 24V
Float mode low level 12.8V x 2 for 24V
Protection: overload, short circuit, over temperature, reverse polarity, no spark, short circuit, 40A time out.
Construction Pol-carbonate casting, water resistant
Approvals EN 60335, EN55014, IP45 body only
Weight 0.4 Kg
Dimensions 150x60x30 mm

Global Smart portable battery charger

Plug type	Voltage AC	Voltage DC	Amps	Weight kg	Part nos
British	110-230	12	5	0.4	GS125B
Euro	110-230	12	5	0.4	GS125E
USA	110-230	12	5	0.4	GS125A
British	110-230	24	2.5	0.4	GS243B
Euro	110-230	24	2.5	0.4	GS243E
USA	110-230	24	2.5	0.4	GS243A

Sterling

Global operation

Portable Multimeters

No Batteries
Wind up to use

Do you ever find yourself needing a multimeter, which you know you have somewhere and when you find it the batteries are flat?

Well, never again, this new product has no batteries so you can leave it as long as you like. Simply wind the handle 2 times for about 2 minutes use or wind for about 10 seconds for about 10 minutes use.

The product is high quality and extremely well equipped with all the features and functions required for general use.

Code
WUVM

GENERAL SPECIFICATIONS

Display 46 mm x 23 mm large LCD
Measurement AC, ACA, DCV, DCA, ohms, continuity beeper, Hz, %, Capacitance, Diode, Data hold.
Range selection Auto ranging with manual selecting.
Data hold to freeze the display reading
Dimensions 152 x 78 x 45 mm
Weight 350g
Includes red and black test leads plus instruction manual

Electrical Specification

D/C voltage
Range Volts 400.0 mV - 1000 v D/C
Accuracy +/- (1% + 3d)
Input impedance 10 M Ohm
DC & AC current
10 A - 400 A
Overload Protection Fuse
Ohms
400-40 M ohm
Capacitance
40nF-100 F
Frequency
4 Hz - 4 MHz
Diode
(forward voltage , VF)
Range 4 V DC
Resolution 0.001 V
Test voltage 1.6 v DC
test current 1 +/- 0.6 amps
Continuity Beeper
Beep if resistance less than 100 ohm
response time < 100 ms

Small microprocessor controlled portable battery chargers

Inc battery maintenance, De-sulphation protection & battery rescue functions

British

Each model is available in **E**uro (Schuko) or **B**ritish socket, simply select **E** or **B** in the part number)

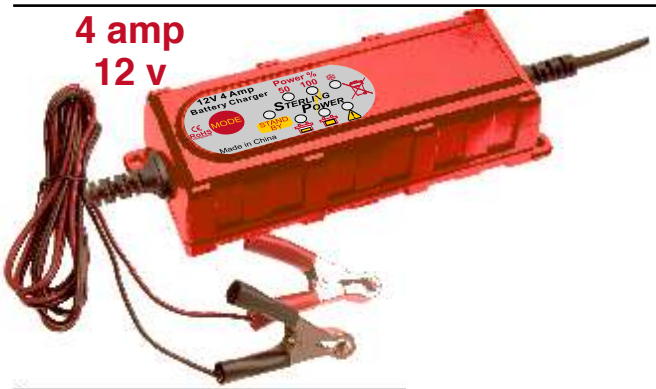
Schuko

6 amp 6V and 12V Battery charger Fully automatic microprocessor controlled.
LED display, Can be set at 2, 4, or 6 amps for 6V and 12V batteries.
2 Amp slow charge--for charging and maintaining small batteries; charges motorcycle, ATV, snowmobile and lawn tractor batteries.
4 Amp medium charge—self-adjusting charge rate idea for everyday charging needs and keeping your battery in peak condition
6 Amp fast charge—charge monitor battery condition and adjusts charge rate downward to prevent battery damage; for car small truck, motorcycle, lawn tractor lead-acid and AGM batteries.
Automatically switches to float charger and maintainence when battery is fully charged, battery rejuvenation pulse function . inc De-sulphation protection
Overheat protection, short-circuit protection, reverse polarity protection, input low voltage and over voltage protection.

Portable micro processor controlled chargers 230V a/c 50 Hz only					
Voltage d/c	Amperes	a/c Plug	Size L x W x D mm	Weight kg	Part no
6 & 12	6	British			B126
6 & 12	6	Euro (Schuko)			E126

5 amp 6V and 12V Battery charger :Fully automatic microprocessor controlled.
LED display, and can be set at 1.2, 2.5, or 5.0 amps for 6V and 12V batteries.
Suitable for all 100CCA-2000CCA lead-acid batteries.
Automatically switches to float charger and maintainer when battery is fully charged battery rejuvenation pulse function. inc De-sulphation protection
User-friendly screen: LED displays charging status and error.
Overheat protection, short-circuit protection, reverse polarity protection, input low voltage and over voltage protection.
Charges for car, RV, motorcycle and small engine batteries.

Portable micro processor controlled chargers 230V a/c 50 Hz only					
Voltage d/c	Amperes	a/c Plug	Size L x W x D mm	Weight kg	Part no
6 & 12	5	British			B125
6 & 12	5	Euro (Schuko)			E125



4A 12V Battery Charger: Fully automatic microprocessor controlled
Microprocessor controlled, ideal for 12V vehicles.
5-stage intelligent charging characteristics. inc De-sulphation protection
Great for WET, GEL, AGM and maintenance-free lead-acid batteries.
Winter charging model can be chose.
Continuous maintenance charging function battery rejuvenation pulse function.
Diagnosis and rescue function for deeply discharged batteries to 7.5 V.
Connection over-insulated charging clips or eyelets possible.
Suitable for outdoor using, dustproof and splash-proof (IP 65).
Safety functions including reverse polarity protection and short circuit.
Battery capacity: 1.2 Ah-120 Ah

Portable micro processor controlled chargers 230V a/c 50 Hz only					
Voltage d/c	Amperes	a/c Plug	Size L x W x D mm	Weight kg	Part no
6 & 12	4	British			B124
6 & 12	4	Euro (Schuko)			E124

3 amp 6 and 12V Battery charger: Fully automatic microprocessor controlled.
LED display, and can be set at 1, 2, or 3 amps for 6V and 12V batteries.
Suitable for all 100CCA-2000CCA lead-acid batteries.
Automatically switches to float charger and maintainer when battery is fully charged battery rejuvenation pulse function. inc De-sulphation protection
User-friendly screen: LED displays charging status and error.
Overheat protection, short-circuit protection, reverse polarity protection, input low voltage and over voltage protection.
Charges for car, RV, motorcycle and small engine batteries.

Portable micro processor controlled chargers 230V a/c 50 Hz only					
Voltage d/c	Amperes	a/c Plug	Size L x W x D mm	Weight kg	Part no
6 & 12	3	British			B123
6 & 12	3	Euro (Schuko)			E123

1 amp 12V Battery charger: Fully automatic microprocessor controlled.
Basic pre set charging , non selectable battery chemistry types
LED display for 6V and 12V batteries.
3-stage charging: bulk-absorption-float.
User-friendly screen: LED indicates charging status, full, fault.
Fault diagnose system.
Overheat protection, short-circuit protection, reverse polarity protection, input low voltage and over voltage protection.

Portable micro processor controlled chargers 230V a/c 50 Hz only					
Voltage d/c	Amperes	a/c Plug	Size L x W x D mm	Weight kg	Part no
6 & 12	1	British			B121
6 & 12	1	Euro (Schuko)			E121

Universal Advanced Digital Alternator Regulators

Can be used as Parallel or stand alone regulators

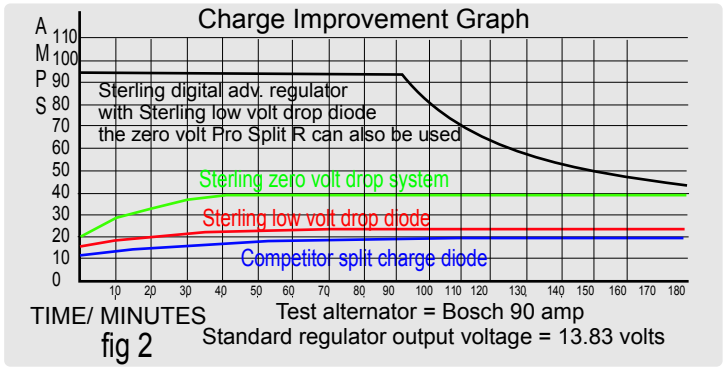
Please note advanced regulators are not suitable for some modern vehicles / boats with integrated engine management systems as they increase the alternator's voltage and this can be interpreted by the management system as a fault on the alternator. Please use an Alternator to Battery Charger or a Battery to Battery charger for these applications.

The Problem with standard systems: Standard alternators are not designed to be good battery chargers; they are designed only to charge an engine start battery sufficiently to start the engine. Due to this inherent weakness, a more advanced regulator is required that, in effect, converts an alternator from a constant voltage battery charger to the latest 4-step progressive constant current battery charger (see battery charger graphs). Because of this improvement in the alternator's control system, these regulators dramatically enhance the alternator's charge rates by between 200-2000% depending on how poor the original system is.
The Sterling Regulator is designed to charge batteries as fast as possible and to their maximum capacity without damage to the batteries or alternators.

What To Expect From An Advanced Regulator:
1) Maintains maximum performance of an alternator's power curve within a preset envelope as defined by battery manufacturers.
2) Batteries charging 4-20 times faster. (depending on original system).
3) Enables 25-35% extra useful power to be stored in batteries. A conventional alternator will only charge the battery to a max of about 75% and, at about 35% remaining capacity, the low voltage level renders it useless. This means that, of 100A of battery capacity, only about 35A are available to be used. An advanced regulator will fully charge the battery giving an extra 25% capacity. This increases the useable available power by about 70 - 80 %.
4) Battery plates kept free from sulphate damage results in longer life.
5) Due to the built in safety features, in the event of incorrect installation the unit will switch itself off.
6) Reduces needless running hours on the main engine.
7) Compensates for voltage drops resulting from long cable runs, ammeters, diodes and other general wiring associated problems.
8) Automatically converts a machine-sensed alternator to a permanent battery sensed alternator.

SAFETY FIRST: The Sterling Advanced Regulator is full of safety features to prevent damage to your system. In the event of incorrect installation or a fault developing on the boat or vehicle, the high voltage trip picks up high voltages at the batteries and the alternator and switches off the advanced regulator (the field circuit is disconnected totally from the control via an internal relay).

The Test: Using a standard 12V, 90A Bosch alternator fitted to our test bench and rotated at a constant speed, the following test was undertaken: 4 x 100A "leisure" batteries were used, they were split into 2 battery banks, one for engine start and three for domestic. The engine start battery was fully charged (to copy that in real life) and the 3 x domestic batteries were discharged until such time as one of our 1800W inverters tripped out on low voltage. To make the test fair we linked 9 batteries together to make one large battery bank then discharged them all to exactly the same level, then, at random, three batteries were selected and used for each test. The idea was to see how many amps could be replaced into a 300A battery bank. Bank discharged to a level one would expect in real life (i.e. about 50-60% empty) over a 3 hour period and to display the results in as simple a way as possible to highlight the difference between all the different options and why an Advanced Regulator is a necessity, not a gimmick.



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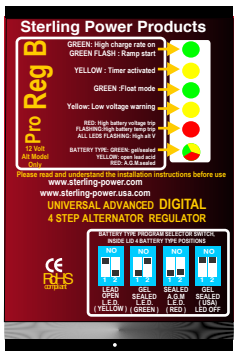


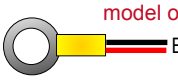
Pro Reg B Advanced alternator regulator			
Voltage DC	Size L x W x D mm	Weight kg	Part nos
12	120 x 70 x 45	0.4	AR12VD

12 v only

new model upgrade can run up to 300% more field current with no heat rise

Pro Reg B

Inc battery temperature sensor and 1 metre of cables.
Please check all the features on this model on next



Pro Reg BW Waterproof Advanced alternator regulator			
Voltage DC	Size L x W x D mm	Weight kg	Part nos
12	120 x 80 x 45	0.4	AR12W

NEW

Pro Reg BW

12V only

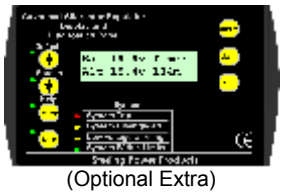
Inc battery temperature sensor and 1 metre of cables.
Please check all the features on this model on next

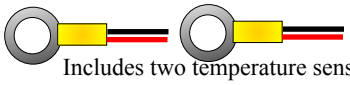
IP 67, Waterproof Ignition protected

Unit actual rating: (the actual device rating) for the Pro Reg B and BW.
Positive field control 8A maximum field current
Negative field control 13A maximum field
Real world rating: (hard to get this information, this is a rule of thumb).
12V alternator with standard regulator fitted, up to approx 350A alternator, more if a negative field control.
12V alternator with no standard regulator, stand alone, about 150A more if a neg field control.

Pro Reg D

Pro Reg D Advanced alternator regulator			
Voltage DC	Size L x W x D mm	Weight kg	Part nos
12 & 24	180 x 90 x 55	0.5	PDAR
Remote control	170 x 90 x 40	0.25	PDARR


(Optional Extra)


Includes two temperature sensors

new model upgrade can run up to 300% more field current with no heat rise

1 model 12V and 24V

Unit actual rating (the actual device rating) for the Pro Reg D
By far the most powerful regulator around due to its fan cooling.
Positive field control 25A max field current.
Negative field control 30A max field.
Real world rating: (hard to get this information , this is a rule of thumb)
12/24V alternator with standard regulator fitted. Up to approx 600A alternator, more if a negative field control.
400A if stand alone, without existing regulator fitted.

Pro Reg DW

IP 67, Waterproof Ignition protected

Pro Reg DW Advanced alternator regulator			
Voltage DC	Size L x W x D mm	Weight kg	Part nos
12 & 24	160 x 96 x 55	0.58	PDARW
Remote control	170 x 90 x 40	0.25	PDARR


(Optional Extra)

NEW

Includes: 2 x temperature sensors

1 model 12V and 24V

Unit actual rating (the actual device rating) for the Pro Reg DW
By far the most powerful regulator around due to its fan cooling.
Positive field control 12A max field current.
Negative field control 18A max field.
Real world rating: (hard to get this information , this is a rule of thumb)
12/24V alt with std reg fitted, up to approx 400A alternator. More if a negative field control
12/24V alt with no standard regulator. Stand alone, about 200A more if a neg field control

Pro Reg	B	BW	D	DW
Digital software control with slow start	●	●	●	●
Dynamic Progressive battery charging	●	●	●	●
Can be used in parallel (recommended) or stand alone regulator	●	●	●	●
Programable for different battery types	●	●	●	●
Single unit fits 99% of alternators and all battery types	●	●	●	●
Charges to 4 step progressive constant current charging curves	●	●	●	●
Self diagnosing fault system	●	●	●	●
Totally isolates the advanced regulator in fault condition	●	●	●	●
Information 6 LED display one tri coloured	●			
Information 8 LED display (B only)		●		
Battery Temperature sensing	●	●	●	●
High battery temp trip	●	●	●	●
High battery voltage trip	●	●	●	●
High alternator voltage trip	●	●	●	●
De-sulphation ability on open lead acid batteries	●	●	●	●
In event of failure auto return to standard alternator regulator	●	●	●	●
Can be used with or without the temperature sensor	●	●	●	●
Monitors for excessive neg voltage drop and trips	●	●	●	●
Protects batteries if temperature sensor open circuited	●	●	●	●
Protects batteries if split charge relay/diode fails open	●	●	●	●
Protects batteries if advanced reg fails closed	●	●	●	●
Protects batteries if battery sense wire falls off or broken	●	●	●	●
10 LED display			●	
13 LED display				●
12 or 24 v operation, selectable			●	●
Remote control option			●	●
Alternator temperature sensor and boost disengage			●	●
Unit thermostatically controlled fan cooling for max performance			●	
IP 67 waterproof & ignition protected for W options		●		●

Advanced Regulator features explained in more depth:

Digital software control with slow start:
Digital control (software) uses lines of computer code, digitally burned into a memory processor in the Advanced Regulator. This means that very complex information and mathematical algorithms can be processed that would not be possible with an analogue hardware system. The unit ramps up the current over a short period of time to reduce the chance of alternator belt slip.

Dynamic progressive battery charging: this is a term used to explain that the internal software calculates a different charging regime every time it is used as the battery state etc. is never the same. Older systems simply used fixed trimmers which were not able to distinguish different battery types or sizes.

Can be used in parallel or a stand alone reg: This unit can be used as a stand-alone regulator as well as in parallel with the original regulator. Sterling believes that, where possible, to leave the existing regulator in place this offers the Sterling Reg a fall back safety position in the event of it failing.

Programmable for different battery types:
Most other manufacturers fail to recognize the fact that the world has more than one type of battery. There are now four main groups, open lead acid/traction, sealed /gel, gel (Europe) and AGM To optimise charging for each of these battery types there are four totally different charging curves, temperature curves and safety criteria with each battery type.

Single unit fits 99% of alternators:
The reason for this is very simple, if you check other makes, you can find 12-15 different models to cover what the Sterling will do with 1. The problem with this is the public must supply correct information about their alternator and batteries to ensure they receive the correct Advanced Regulator.

Charges to 4 step constant current progressive charging curves:
All good battery chargers are constant current with 3 - 4 step charging curves. This method is recognized as the best charging type so why expect anything less from your alternator- in most cases the primary battery charging source. The Sterling Advanced Regulator converts your basic constant voltage alternator into a modern 4 step constant current battery charger, it's that simple.

Self diagnosing fault findings:
The performance and benefits of an Advanced Regulator are beyond dispute, however, an Advanced Regulator which has been incorrectly installed or fails, can have devastating effects on a boat. It will destroy the batteries and could easily set fire to cables.
Sterling takes all this into account and recognizes that some boats on which these regulators are used have poor wiring and other faults. Because of this we scan the system every two seconds and if all the parameters are not within our pre-set values then the unit will switch 'off' and signal a fault. This, in my opinion, is the most important aspect of this type of device, a point not shared by our competitors.

Totally isolates the regulator in a fault condition:
This is very important and not fully understood by the public. All regulators can fail for different reasons. If an Advanced Regulator fails closed then the alternator will work at full power and destroy everything around itself. Simply turning the regulator 'off' will have no effect, so in the event of a Sterling system failing or tripping, for whatever reason, we physically break the field wire guaranteeing that the Advanced Regulator will stop working

Information LED display:
Most Advanced Regulators have no real information being transmitted to the operator and as a result one has no idea what is going on. Depending on the model we give the operator as much information as possible as to what is happening with the product and the installation system in general.

Battery temperature sensing:
One battery temperature sensor is supplied with the unit. This will adjust the output charging curves with the ambient battery temperature.

High battery temperature trip:
Most Advanced Regulators monitor the battery temperature to perform the task as explained above, but what is the point of monitoring the temperature if in the event of a battery going over temperature you do nothing about it? Sterling software will pick up the high temperature and in the worst case of a battery exceeding 50 deg C, will switch 'off' the regulator and display a warning.

High battery voltage trip:
In the event of the battery voltage going too high the unit will switch the regulator 'off' and display a warning.

High alternator voltage trip:
This is the most common trip used. In the event of poor wiring, incorrect installation, or any fault in the system, the alternator voltage will rise too high; the unit will trip out and display a warning.

De-sulphation ability on open lead acid batteries:
In order to prevent and even de-sulphate lead acid batteries a regular charge cycle exceeding 14.4V (x 2 for 24V) will remove the sulphate from a battery bank and so prolong its life expectancy.

In event of failure auto return to standard regulator:
There are many good reasons to leave the standard regulator in place, one of them being that, in the event of a Sterling failure or any trip condition of the advanced regulator, your standard regulator will automatically take over and allow the journey to continue but at a lower charge rate. If your Advanced Regulators does not offer this feature then you will lose the use of the boat during any failure.

Can be used with or without temperature sensing:
Some people don't want to fit temperature sensors, the choice is yours, the software will pick up if you use it or not and control accordingly. Most other makes insist a temperature sensor be fitted.

Protects batteries if temperature sensor open circuited:
A big problem with temperature sensors (why people don't like fitting them) is that they are on a battery. If someone changes the batteries and breaks or open circuits the temperature sensor wire, most Advanced Regulators will destroy your batteries by over charging them. Not so with a Sterling. In the event of a failure of a cable break the Sterling software will pick it up within 2 seconds and return to the default settings and carry on safely. It will also protect batteries if split charge relay/diode fails open circuit.
A common fault when fitting an Advanced Regulator is the old split charge diode or relay that is not up to handling the new performance, resulting in a regulator to fail. This will result in the destruction of the other battery bank, as the battery sense wire will be isolated from the alternator (but not with a Sterling, again our software jumps in and saves the day).

Protects batteries if advanced regulator fails:
In the unlikely event of the Advanced Regulator failing then most regulators will fail closed and destroy all your batteries (would it surprise you to know that the Sterling software will jump in and save the day again?).

Alternator temp monitoring and disengagement:
This unit can monitor the alternator temperature and switch off the control unit in the event of high alternator temperature. The Advanced Regulator will automatically re-engage when the alternator cools down.

Thermostatically controlled fan cooling: Pro Reg D only
This is the only fan cooled regulator on the market (as per 2013) and offers the ability to connect this device to massive alternators if required, this unit can deliver field currents up to 20 amps plus , allowing use on alts way up to 600 amps plus or work in extremely high ambient temperatures, we are unable to correctly advise on the maximum performance of this regulator against any large alternators as we have simply been unable to stretch it to its maximum with any alternators we have found to date to run with it.

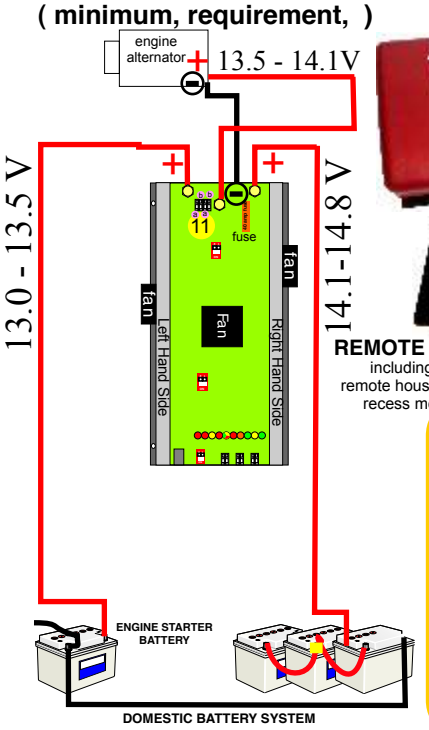
Pro Reg Alternator max sizes

Pro Reg B up to 250A with standard reg /130A stand alone
Pro Reg BW up to 350A with standard reg /150A stand alone
Pro Reg DW up to 450A with standard reg /200A stand alone
Pro Reg D up to 600A with standard reg /400A stand alone

Alternator to Battery chargers

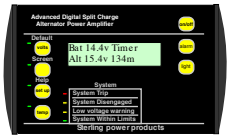
Not just a new product but a whole new concept
All the performance of an advanced alternator regulator without all the fitting

System wiring, single or twin alt (minimum, requirement,)



REMOTE CONTROL (OPTION)
including 10 metres cable Unique remote housing can be surface mounted, recess mounted or flush mounted

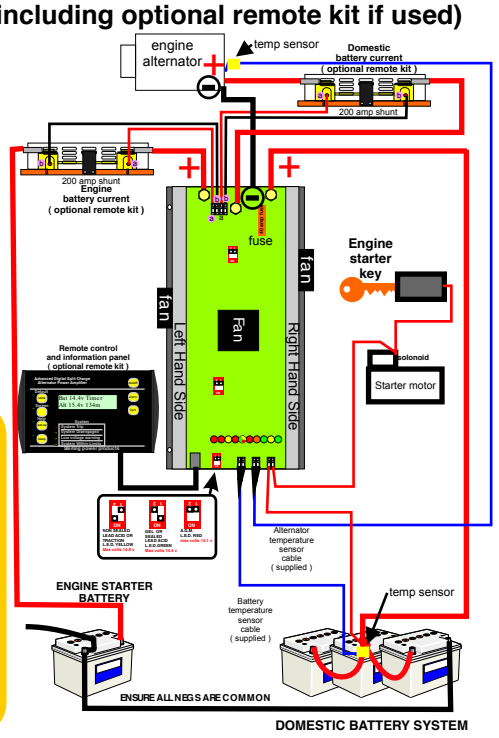
Remote control and information panel (ABRC)



Alternator to Battery chargers

D/C voltage	Max Alt amps	Size L x W x D	Weight	Part nos
12	80	250 x 180 x 70	2.5	AB1280
12	130	250 x 180 x 70	2.5	AB12130
12	300 NEW	370 x 288 x 70	5.0	AB12300
12	400 NEW	370 x 288 x 70	5.1	AB12400
24	80	250 x 180 x 70	2.5	AB2480
24	200 NEW	370 x 288 x 70	5.2	AB24200
Remote for above products in Blue (no shunts)				ABNRC
12	160	250 x 280 x 70	3.5	AB12160
12	210	250 x 280 x 70	3.5	AB12210
24	100	250 x 280 x 70	3.5	AB24100
Remote for above product inc 2 x 200 amp shunts				ABRC

Full system wiring single or twin alt (including optional remote kit if used)



Charge your batteries over 5 times faster, input 50% extra power plus de-sulphate the batteries and make them last longer.

Can be used with 2 alternators

Available in 80 / 130 /160 / 210A models

This is a 100% unique product, not available anywhere else in the world, and totally designed and conceived by Sterling in order to overcome all problems experienced now and anticipated in the future with standard advanced alternator regulators. This following explanation is to help understand what it does and where it should be used and should not in any way be taken to demean any of the other charging products we manufacture.
The Digital Advanced Alternator Regulator offers the best low cost technical solution to maximise the performance of your alternator ensuring *adaptative charging*. There are, however, applications and markets that require a different approach to increasing the alternator performance; without all the work and expertise required to install a regulator.

Issues with advanced alternator regulators are:
The main problems with all standard advanced regulators are:
1) **Relatively difficult to install.** This prevents semi skilled personnel from fitting .
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 .
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 alt is not tampered with.
5) **E.C.U. problems** Many new engines 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, motor homes and the latest marine engines). 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 alternator's regulator, we override the standard alternator regulator and we push the alternator's voltage up to increase the voltage at the batteries. This results in a massive charge improvement at the batteries.
With the alternator to battery charger 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 our digital advanced alternator regulator.

When would I use an alternator to battery charger over an 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 an 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.

This new product incorporates a split charge system to charge 2 battery banks. However, on the domestic battery bank channel only, there is a unique voltage amplifier. 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 14.1V (for AGM) 14.4V (for GEL) and 14.8V for open lead acid/traction. The same advanced program is used in the very successful Digital Advanced Regulator. Both products 'fail safe', allowing the original regulator(s) to operate.

What other uses for this product?
This product could be used on any other product which has a 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 timer 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. An extension cable can, however, 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 remote control is purchased it can measure the current to the domestic system (on both remote models). The remote on the 160-210 amp models can also measure the alternator and starter battery currents it comes complete with 2x pre-wired shunts that enable 2 currents to be monitored and the third current to be derived from the first two using the embedded software. The end package is a very simple and easy to instal with all the performance and safety features of the most expensive Advanced Alternator Regulator, but with an extremely simple and convenient installation method.

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

The illustration below shows results from bench tests representing a typical split charge system with an engine battery of 100Ah (standard lead acid) and a domestic battery of 3 x 100Ah (standard lead acid). The engine battery was discharged to 11V (about 10 engine starts) and the domestic bank to about 11V (will no longer run an inverter and is about 60% empty). The alternator used was a Bosch 90A with a standard 13.9V (variable) regulator. The unit battery type is programmed to open lead acid. There are 2 graphs, one is the current delivered into the batteries, and the other is various voltages measured 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 the standard alternator voltage is at position 4 on the voltage curve, however, the input voltage has been pulled down to position 5, the effect on the alternator output current is full output at position 8 - 9 , this is where you can clearly see the standard alternator current without the advanced charging system taper down fast from 80 - 30A over the same time (from position 2-3). The advanced charging equates to about 70A improvement over the standard non-assisted alternator.

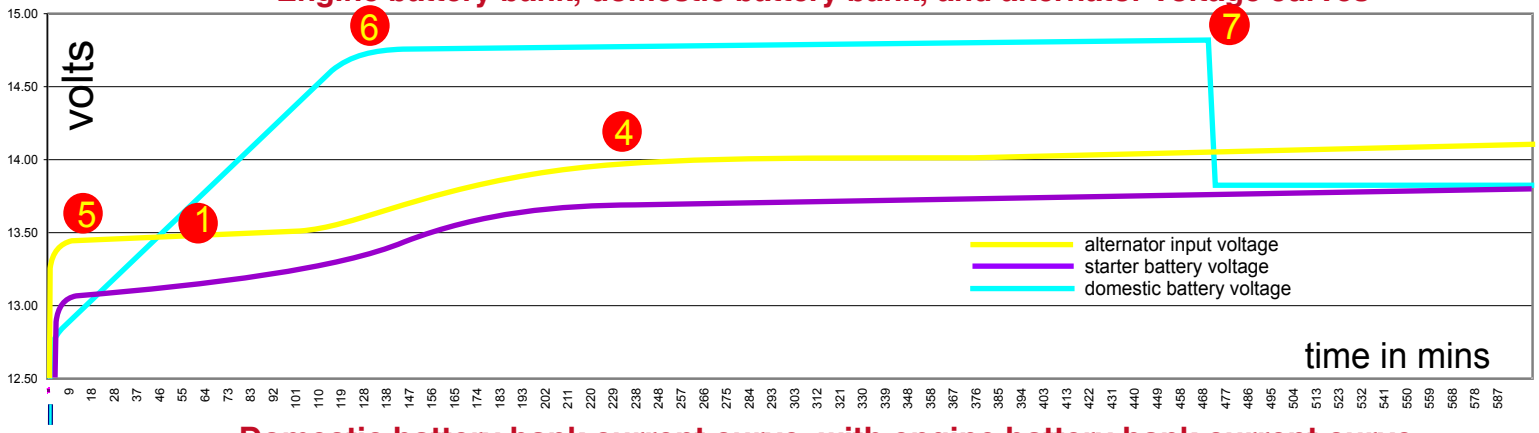
Position 1: This is the most interesting stage where the magic is at work, the point where the domestic battery voltage exceeds the alternator input voltage, this is what the advanced charging process is all about.

The current graph: The domestic current graph clearly shows the constant current charge between points 8-9, at position 9 the current starts to taper off until it reaches position 10. The accuracy of the software can be seen when the voltage drops from the high voltage charge to the constant voltage charge (float), the current only dropped 5A, (at position 10) showing without doubt that the software program was spot on, the batteries could not accept any more charge and were clearly full. The high charge voltage is maintained between voltage positions 6-7 at 14.8V.

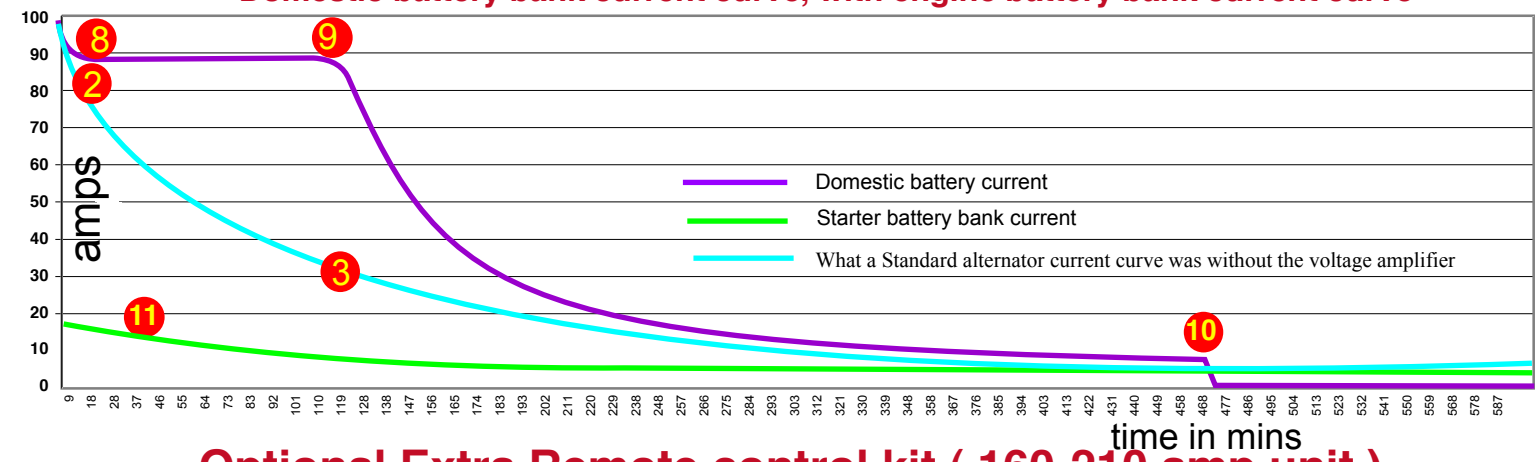
Engine priority

Position 11 shows that through the whole process the engine battery continues to charge and is not deprived of its charging voltage, the engine battery performance is the most important, as, at the end of the day it must be able to restart the engine.

Engine battery bank, domestic battery bank, and alternator voltage curves

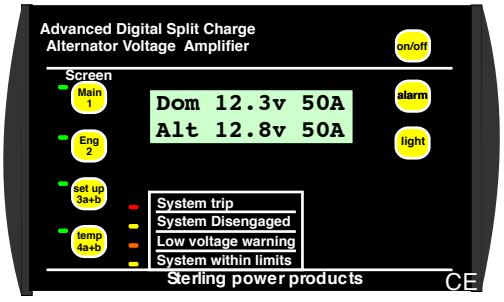


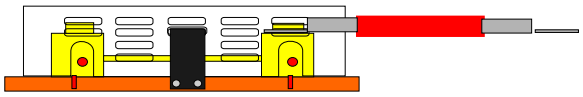
Domestic battery bank current curve, with engine battery bank current curve



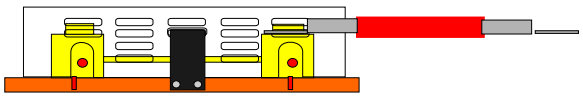
Optional Extra Remote control kit (160-210 amp unit)

Included parts: the remote panel, 10 metres of pre-wired link cable and 2 x 200A pre-wired shunts. The 2 x shunts enable 2 x real currents to be measured and 1 x current calculated in the software the 3 x currents to be measured, accuracy +-5%





200 amp shunt



200 amp shunt

Screen1:
Push the button marked Main 1, this is the main screen and the best one to leave the unit on. It shows the domestic battery voltage and current, also the alternator output current

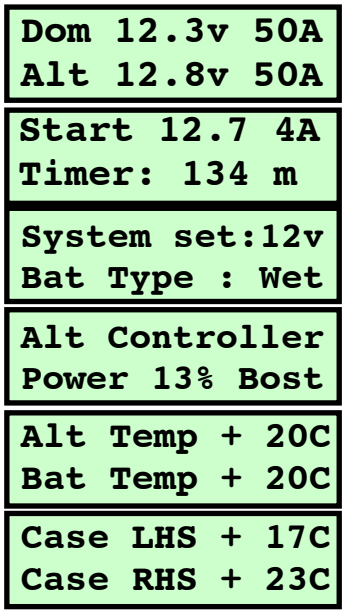
Screen2:
Push button marked Eng 2. It shows the engine battery voltage and current. This screen also shows the elapsed time.

Screen 3a:
Push button marked Setup 3**a+b**: There are 2 screens on this button. Push once for screen **a**, then again for screen **b**. Screen **a** shows the system setup, this refers to the domestic battery only

Screen 3b:
Push button marked Setup 3**a+b**: There are 2 screens on this button. Screen **b** shows the effective boost being delivered at this time and ranges from 0% (during the rest periods and on float) to 100 % when system on full power

Screen 4a:
Push button marked Temp 4**a+b**: There are 2 screens on this button. Push once for screen **a**, then again for screen **b**. Screen a shows the alternator temp and the domestic battery temp. If the temperature sensors are not fitted it will default to 20 deg C

Screen 4b:
Push button marked Temp 4**a+b**: There are 2 screens on this button. Push once for screen **a**, then again for screen **b**. Screen **b** shows the box heat sink temperatures, LHS stands for left hand side, guess what RHS stands for.



Battery to Battery chargers

High power versions
16-100 amp

Original model
12/24V models, up to 50A (at 12V)

New model 12V / 100A
Jan 2013

incl. 10m cable can be surface mounted, recess mounted or flush mounted

Waterproof (IP68)
12/24V models - up to 30A (at 12V)

inc.
2 meters of
pre-wired cables
with fuses

This increasingly popular device has a massive amount of applications never before undertaken, from charging your caravan battery, golf trolley, while driving along in your car, to charging large battery banks in lorries or boats. The key thing about this product is the ease of installation and the fact it does not work nor change anything on the standard engine/ vehicle system and as such does not raise any warranty or installation issues.
Fully programable for different battery types.

Why do I need the d/c *adaptative* battery charger?

By now you will appreciate that the best way to charge a battery is using a 4 step battery charging curve (that cannot be achieved from a standard alternator). This system enables one to simply attach the unit to a standard engine battery and it will fool the alternator into working at it's maximum ability and ensure all it's surplus power is used to charge the auxiliary battery bank to it's maximum. This system is designed to use only the surplus power and ensures that at all times the power required to run the primary system (the vehicle system or the boat engine) is not affected. The surplus power is converted into a higher voltage and used to charge a secondary battery bank using a digitally controlled programmable 4 step charging curve as per all the other high charge products Sterling makes.

What performance improvements would I expect?

In a nutshell it charges your extra battery system about 5 times faster than it would otherwise charge. However, in the case of things like caravans this could easily increase 20 fold. This also, at least, doubles the useful power subsequently available, and increases battery life by de-sulphating them.
For best effect, use open lead acid batteries, avoid gel, sealed and A.G.M. batteries (see 'which is the best battery' article in the brochure).

Advantages of this unit.

1) Installation: it does not get any easier, simply connect to your starter batteries and to your domestic battery, job done, makes for easy and low cost installation.
2) No direct connections to the standard engine alternator, or to the outboard (if used on an outboard), thus, on new installations there is no extra wiring for a split charge system.
3) Ensures the engine battery system is not interfered with.
4) Multiple units can be used, for example, if you have a 60A alternator, and 3 battery banks (engine, domestic, and bow thruster) then 2 of these can be used to run the bow thruster and the domestic system. The internal programs will adjust their charge patterns to accept the other unit and ensure only the excess power is used and the primary system is not placed in jeopardy.
5) Ensures there is no voltage rise on the engine management system, to ensure no alarms nor damage to the system, be it an outboard, a car, a boat or a camper van
6) No vehicle warranty issues as you are not connected to the main system

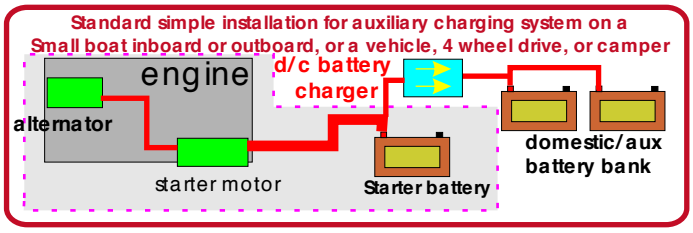
How does it work?

The unit monitors the engine start battery, the unit will not start until the battery voltage exceeds 13V then it waits for 150 seconds, this ensure that some charge is replaced after engine start. It then pulls the engine battery down to no less than 13.3V, this enables the engine battery to still receive a charge and ensures the alternator works at its full potential. This further ensure the engine battery is okay.
Other features included in this system are remote control option, alternator temperature sensing (for larger models), battery temp sensing, ignition feed (if required), automatic start and shutdown.
7) Voltage reduction: (new external fan model only) another major key advantage of this unit is that not only can it boost the voltage up on the output but it can also reduce the voltage on the output, (so why do I need this feature) the truth is in most applications you do not, however, on some modern engines, due to the introduction of calcium batteries the alternator manufactures have increased the standard regulator's voltage to punch through the calcium in the batteries. There are now many alternators fitted with exceptionally high output voltages, for example, there are some common (on boats) Hitachi alternators which are fitted with regulators which are 14.6V +/- 0.2V, we have certainly seen these alternators produce up to 14.8V and we have even seen some car alternators reach 15V on first start up, this is great if you have open lead acid batteries but fatal to an AGM, Gel or sealed battery. So, in this case, it is necessary not to boost the voltage of the alternator but to reduce its voltage. This new generation of battery to battery chargers do both, so, in effect, we do not care what the alternator voltage is, it can be between 13.5V to 15V we will deliver the correct charge and float voltage to your expensive domestic battery bank.

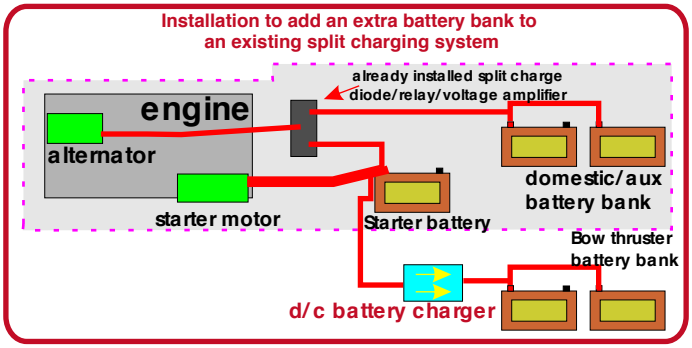
We also offer a range of 12-24V / 12-36V / 24-24V / 24-36V / 24-12V

The dotted line shows the original system and shows how simple it is to connect the bat-bat charger

This unit can be used to charge extra battery banks from boat Inboard engines, boat outboard engines vehicle engines (cars/lorries/vans) caravans, camper vans and generator engines.



This is the most common and simplest installation and is simply connected to the starter battery. In order to connect up the d/c battery charger all you do is connect one wire from the auxiliary battery banks to the starter battery, the starter battery stays between 13-14V (within its limits) and the domestic battery goes up to 14.4V-14.8V. In order to put a good fast charge into the auxiliary batteries, this is especially good if the battery bank to be charged is not close to the starter battery and things like bow thrustors or batteries in the boot of cars or lorries.

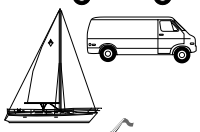


This option shows a typical split charge system on any boat or camper vehicle, already installed and that has been using advanced alternator regulators or any other advanced charging system. Assume that then an extra battery bank is required, such as a bow thruster, radio battery bank or a generator. For ease of installation simply drop on a d/c battery charger.

Helpful hints on which product would suit which use

Small (waterproof) Applications for the 16A model include: **Small outboard motors** up to about 30 hp with magneto charging systems, small **portable generators** sets with 12V auxiliary charging systems which are very ineffective, charging **electric wheel chairs** in transit, charging **electric golf trolleys** in the boot of cars, **starter battery banks** from larger main battery banks such as on a boat from a combi, charging **caravan batteries** via an aux power point on a car while the car is driving along (charger about 20 times faster than normal) **charging batteries up to about 80Ah.**

30A model: (waterproof) Camper or work van with alternator up to about 60A auxiliary systems, larger marine **outboards engines** with alternators up to about 40A, bow thrusters, anchor winch battery banks, **battery banks up to about 150Ah**



60A model: (waterproof) Camper or work vans / boats with alternator up to about 80A and battery banks about 100-300 Ah.

120A model: Camper or work vans / boats with alternators over 120A and 100-500Ah+ battery bank.

Battery to Battery chargers / NON WATERPROOF

D/C Input voltage	D/C output voltage		Amps in	Size L x W x D	Weight	Part nos
12	12		50	200 x 270 x 70	3	BB1250
12	12	NEW	100	190 x 100 x 70	1.5	BB12100
24	24		30	200 x 270 x 70	3	BB2430
Remote control for items in green				110 x 68 x 20		BBRCNX
12	24		50	200 x 270 x 70	3	BB122450
24	12		30 in / 50 out	200 x 270 x 70	3	BB241250
Remote control for items in red					0.05	BBRC

Battery to Battery chargers / IP68 FULLY WATERPROOF

D/C Input voltage	D/C output voltage		Amps in	Size L x W x D	Weight	Part nos
12	12		25	230 x 135 x 65	3	BBW1220
12	24		25	230 x 135 x 65	3	BBW1224
12	36	NEW	25	230 x 135 x 65	3	BBW1236
24	24	NEW	13	230 x 135 x 65	3	BBW2424
No remote control for the above						

R.G.B.F ReGenerative Breaking Friendly

New, higher powered, waterproof (IP68) model.

Not just a booster but a reducer as well giving full charge control regardless of alternator voltage.

Available Feb of 2013

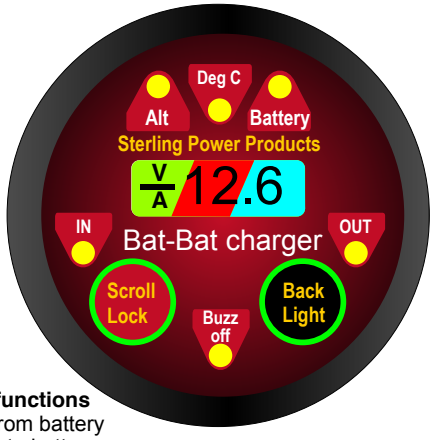
IP68 Electronics Fan not IP68

Inc 2 x temp sensors

145 mm Long, 110 mm Wide, 120 mm Tall

Remote control: cut hole diameter 54mm (optional extra)

R.G.B.F ReGenerative Breaking Friendly



Battery to Battery chargers

D/C Input voltage	D/C output voltage		Amps in	Water proof	Size L x W x D	Weight	Part nos
12	12	NEW	60	yes	145 x 110 x 120	3	BBW1260
12	12	NEW	120	yes	TBA		BBW12120
12	24	NEW	60	yes	145 x 110 x 120	3	BBW122460
Remote control					52mm diameter		BBRCN

Remote control functions

1) Input voltage from battery
2) Output voltage to battery
3) Input current to battery
3) Waterproof display, encapsulated electronics
4) Screen colour change for alarm/charge/ok state
5) Battery and alternator temperature reading
6) Buzzer alarm and override function
7) Information scroll option
8) Back light option
9) Little power consumption when on sleep

Remote control allows access to all the relevant information, the panel comes complete with a 10 meter telephone type extension lead. The meter is in a standard 450 mm threaded housing. This is an optional product and is not required for the operation of the main products.

This new next generation compact model incorporates IP68 (full waterproof) for the main product, however, the fan is external to the product and is not IP68. In the unlikely event the product gets completely immersed in water and the fan destroyed the fan is a standard 40 mm fan on a 2 pin connector and can be easily and cheaply replaced, the main unit would not be damaged.

The unit has an internal magnetic programming ability with the magnet being in the lid of the product so as not to lose the magnet. The magnetic programmer can be used to simply select 1 of 5 battery types to ensure you can charge the battery bank correctly (AGM, sealed lead acid, open lead acid, calcium, and $LiFePO_4$) (lithium).

Ideal for many applications and suitable to cure the problem associated with vehichesl with **Vehicle Re-gernative breaking problems**

What is Re-gernative breaking

A new very serious issue for axillary charging systems has now been introduced in a lot of vehicle and small vans, its called Re generative breaking, where as it's a great idea as far as the primary vehicle is conserved (add extra MPG to the vehicle specification) it's a un mitigated disaster as far as the aux battery charging system is concerned .

So want does it do . In order to increase efficiency of vehicle fuel consumption , on vehicle start up, the idea is to only charge the battery with enough power to safely re start the engine, once this has been achieved after a few mins then the alternator drops its voltage from about 14.4 v to about 12.5 volts leaving " space " in the battery , this idea being that at 12.6 volts the alternator has sufficient voltage to power the engine systems without accessing the battery power , but not enough voltage to charge the battery fully. On application of the vehicle breaks then the alternator voltage ramps up quickly to boost large amounts of power into the space left in the battery, this loads up the alternator which helps on the vehicle breaking and adds a spurt of power to the batteries, once the breaking is removed then the voltage drops again and that " free " power boosted into the batteries is then used by the vehicle, once its used up the 12.6 v at the alternator simply takes over, this is great for the primary vehicle and does what it says it does but means the aux battery system simply cannot get charged .

The solution is our new Bat to Bat charger have both a auto setting and a ignition setting , if you have a regenerative system simply select the ignition setting and even when the vehicles electrics drops top 12.6 volts (or lower) we simply take that voltage and boost it up into your aux battery system ensuring steady power charging regardless of the vehicles voltage variations .

Fully adjustable for battery type and other functions.

Encapsulated electronics, fully waterproof thermostatically controlled fan cooled for smaller footprint. Fan is not IP68, however, it is designed to be easily replaced in the event of a failure.

Tow Charger

Increase your charging speed by 400%
Increase your effective battery capacity by 100%

Wildside Range

R.G.B.F ReGenerative Breaking Friendly

Free to travel

Many caravanners want to enjoy the freedom of the road and engage in 'Wild side' camping, however, this usually means you need to rough it. Your favourite electrical products simply cannot be used as much as you want. You find yourself being restricted to caravan parks having to go from site to site to get to a 230V hook up to charge the batteries. You may have to carry a portable generator around to run all day to keep the batteries fully charged to keep the kids happy, with the tow charger they can do all this while moving about from area to area. As little as a 30 minutes drive can replace an average daily usage of the batteries. Why not take full advantage of this type of product and beef up your battery banks and add an inverter for a hair dryer or microwave - all fully possible with this product.

There are simply so many applications for this product that we had to pick 2 key markets and cover them. As with any new product/concept there is a lot of explaining what the product is going to do for you and how you will benefit from the product.

Over the years modern vehicles' ability to generate large quantities of surplus electrical power has increased. During this time frame the power required from the vehicle being towed as also grown at the same rate, however, the ability to transfer that power from where it's being generated to where it is required (the towed vehicle) has simply not kept up with the times. The end result is a caravan which no longer gives the owner the freedom it was originally designed for. In the 50s there were no portable TVs, Playstations hair dryers and microwaves. So, In order to re-capture the essence of the caravan we must revisit the power system.

The problem
The main problem is thin copper cables causing massive voltage drops - when the power reaches the battery in the caravan there is little ability to deliver it. The standard 7 or 13 pin socket gives a 1.5 mm2 cable for the lights etc and a 2.5 mm2 to charge the battery and a 2.5 mm2 to run the fridge. The other problem is the vehicle's alternator as it is a fixed voltage device. The Wildside allows for voltage regulations to step charge the battery.

The new concept from Sterling is to allow a lot more power to be transmitted to the tow vehicle. Not only in the form of many more amps but also to increase the voltage offered to the tow battery banks to ensure a fast and full charge is given. The more exotic battery chemistry needs are correctly dealt with - the end result is a product which can charge up to 5 times faster and can increase the available useful power by over 100 - 500% + against conventional tow charging methods. We also supply 10A auxiliary path to run other items such as a fridge or other 12V appliances on the tow vehicle.

Increase battery life
Almost 100% of caravan batteries that are replaced are replaced because they are sulphated. They are sulphated because they are never charged correctly. The tow charger ensures each battery type is charged according to its correct charging voltage requirements which, inturn, will extend the life of the batteries.This frees your caravan or boat from continual reliance on fixed camper sites to charge up your batteries giving you the freedom of the road to enjoy your '***Wild side***' lifestyle. The product also does away with the need to carry portable generators on board with petrol being kept inside the vehicle.

At Sterling we like to sell all our products based on facts and not fiction as facts speak louder than old wives tails. We commissioned tests to determine the advantages of using the ***Wildside*** tow charger over conventional charging systems under normal caravan towing conditions. This was not only to determine how much faster it charges the batteries but how much actual power it transmits into the battery.

Battery charging test: we will perform 2 main tests

The tests: The cables used were the standard 1.5 mm2 cable one would expect to see on a vehicle tow system, this was repeated using 2.5 mm2 cables and 2.5 mm2 negative cables to see the effective performance difference. The final test was the **Wildside** tow product kit fitted with 16 mm2 cable, all information regarding voltages, amps, amp hours, were logged and compared.

Test 1: The first test is a pure technical test to show the potential charging performance of the **Wildside** against the conventional charging systems. This test is assuming the worst case (a flat battery) and a 2 hour road journey to see how much faster and fuller the **Wildside** can charge your battery bank in that time frame.

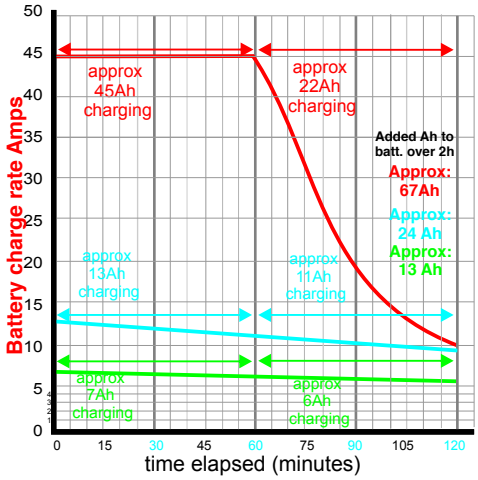
Test 2: This test is a more real world realistic **Wildside** camper routine. With a fully charged battery (20A, 3 stage charger left overnight for 16hours) we put a load on the battery for 1 hour (3 lights plus a TV = approx 300W of power or about 25 Ah). With the fully charged battery **minus** the approximate 25Ah we then simulated a 1 hour drive to attempt to return the charge back. The first attempt we used a 1.5mm2 cable under charging, then the whole process was repeated (i.e. the battery was fully charged overnight etc.) for the 2.5mm2 cable and finally repeated with the **Wildside** unit with 16 mm2 cable. This was in an attempt to see how much charge could be returned into the battery over 1 hour.

Things you should know about this test.

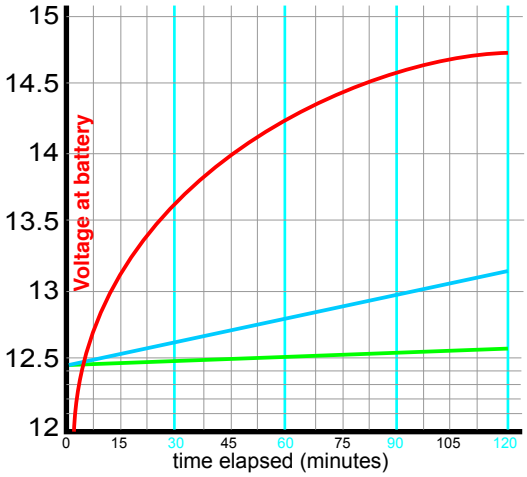
1) **The Alternator,** was a Bosch 90A with the regulator at 14.2V at the output of the alternator (the performance of the below graphs would improve the higher the output voltage of the alternator and decrease the lower the output voltage.

Test 1 - charging battery from flat - refer to key

Charging battery from flat for 2 hours using 3 different methods

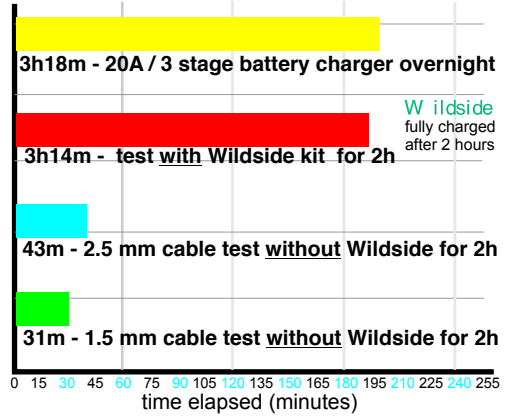


Battery voltage increase while charging with and without Wildside



Key:
Red = Wildside w/ 16mm sq charge cable
Blue = single 2.5 mm sq charge cable
Green = single 1.5 mm sq charge cable

Battery discharge time with fixed inverter 200 watt load after being charged with and without a Wildside for 2 hours from completely flat



Some modern vehicle alternators start off at a high voltage (approx 14.9V) but then drop to a low voltage after an hour or so (approx 13.5V), however, the 14.2V we regard as a fair / average test voltage.

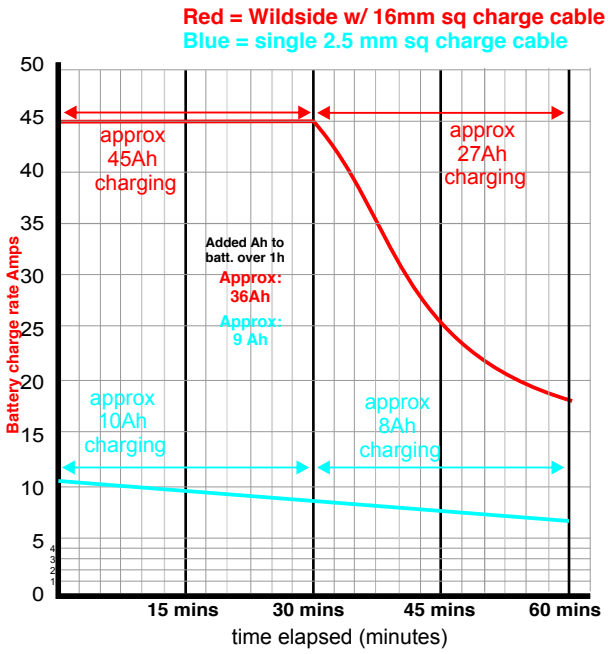
2) **The wiring,** this test is performed under near perfect wiring and connection conditions, the connectors are new, the plugs are new so the test would be the best test possible. The cable length from the alternator via the engine battery to the caravan battery was measured @ 8 meters (for all tests). The more real world on an older installation. I would guarantee a lower performance on tests 1 and 2 than the test we have done here, we are therefore extremely confident that the tests provided are truthful and honest (and totally reproducible by anyone wishing to try).

3) **The battery** used was a so called "Leisure battery" (Alphaline , marked as 115 Ah at a 20 hour rate), chosen at random and mentioned for disclosure purposes only and not a promotion for this battery or battery type. We have no reason to believe this battery is any better or any worse than any other battery of this type.

We used the battery for a few cycles to take the new edge off the battery (new batteries on the first few cycles give great performances, however, this quickly disappears) then we fully charge the battery with a high performance charger (Pro Charge Ultra) for 24 hours to ensure maximum charge. We then connected a 300W inverter with a 200W load (approx 18A draw) and discharged the battery until the inverter stopped working (about 10.5V), the time to achieve this was logged (this established the max performance one could get from the fully charged battery and also established the technically "flat / empty" state of the battery).

The vehicle was then run for 2 hours while we monitored the recharging of the battery under different conditions using a standard tow bar 7 pin connector (one would expect the same from a 13 pin connector). The first charge curve was with the 1.5 mm2 negative and positive pin being used then we used the 2.5 mm2 negative and positive and finally the ***Wildside*** with 16 mm2 cable to see what the difference was.

Test 2 - charging battery which has be drain by 300Wh (approx 25Ah) from full



Conclusions

Conclusion for test 1: Charging an empty battery on a 2 hr journey: from the charging graph (1st graph page 14) you can see that on an empty battery the tow kit will replace over 6 times more current than a 1.5 mm charge cable and about 3 times more than a standard 2.5 mm2 cable. Similarly, with the **Wildside**, you are charging at a higher voltage (refer to 2nd graph (charging voltage) page 14) which significantly increases the power delivery into the battery this shows when we come to drain the batteries (3rd graph (load) page 14). After only 2 hours of charging the battery it lasted 3h15m which is 4.5 times longer than the 2.5mm2 cable charging and 6.3 times longer than the 1.5mm2 cable. As you can see from the graphs that after 1 hour most of the **Wildside's** work was done, the second hour was spent tapering off. Had the battery bank been larger the **Wildside's** performance would not have tapered off so seemingly prematurely. It would have sustained that 45A charging for a lot longer and would have been even more impressive. Even with the 500%+ performance improvement there was lots of potential power which could have been delivered, leaving huge scope to increase your battery bank to take full advantage of this extra power delivering ability. To take full advantage of the **Wildside** you should triple/quadruple your battery bank size to 350-450Ah and you would, indeed, be well catered for.

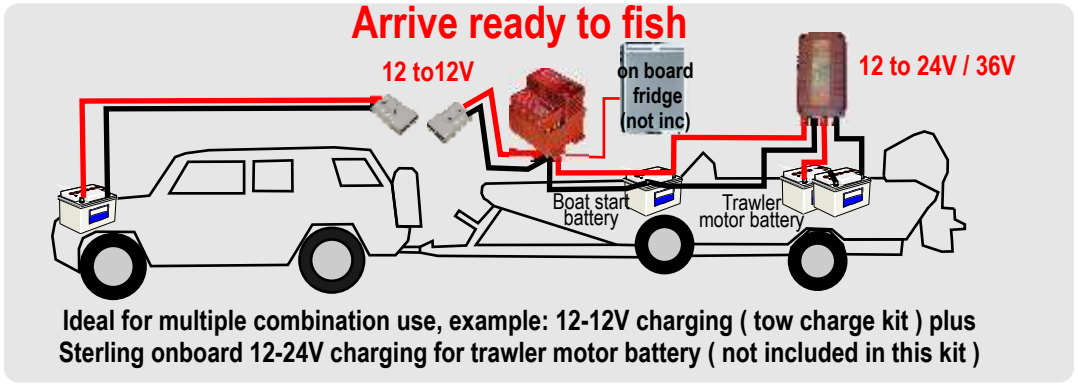
Conclusion for test 2: Charging a battery that has been flattened by 300Wh (300W for 1 hour) from fully charged. With the **Wildside** unit attached we see 35Ah of charge entering the battery which will more than replenish the 27A (max) drained over the 1hour period. The 2.5mm sq cable only replenishes 9Ah over the 1 hour period. Thus, the **Wildside** product provides a 4 times improvement over the standard setup.

Other benefits: Due to the fact that up to now caravans have been unable to effectively charge batteries. Similarly, attempting to store power in large battery bank was pointless, as such they have notoriously small batteries on board. I.e as low as 50Ah, with this device all this can change, now you can have a serious battery bank as the ***Wildside*** will give you the ability to charge it. There is simply no reason why you cannot have 2-300Ah battery bank, fit an inverter and have an active microwave, hair dryer etc. on board. **Wildside** camping need not mean roughing it.

Other Key market applications:

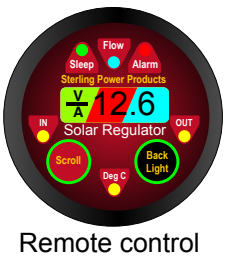
Bass Boat fishing (USA , Australia)

This product runs in conjunction with the on board Sterling 12-24 or 12-36V battery to battery charger and gives the Bass Boat Fisherman the ability to ensure their onboard trolling motor batteries are fully charged *in situ* when they arrive at any event and are also re-charged in the transit journey between events. The tow charger maximises the power delivery to the boat and the onboard battery to battery chargers delivers it to the trolling motor batteries. The waterproof onboard Sterling 12-24V or 12-36V battery to battery charger (not included in this kit, sold as a separate product) is also used to keep the trolling motor battery topped up as you move from fishing spot to another fishing spot. The same product would be automatically activated when the engine starter batteries receives the charge from the Tow Kit. The tow kit can deliver 40A at 12V which is about 20A at 24V, so, a 24V / 100A battery bank could be charged in a few hours of driving ensuring that your batteries are in good operational condition as you move from event to event.

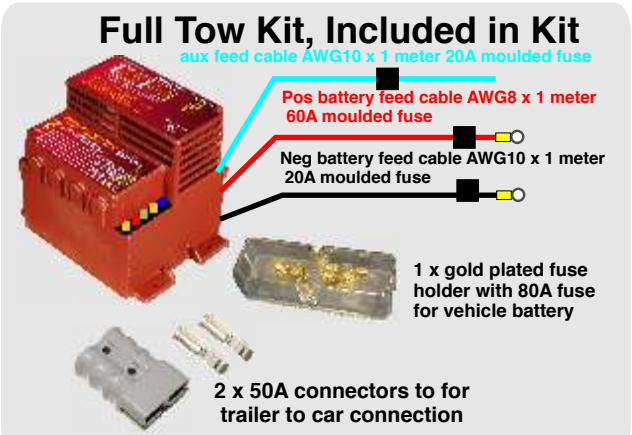


Please note, the products requires you to run a 16 mm sq (AWG 6) positive and negative direct from the alternator or the vehicle starter battery to ensure that enough power is delivered to the product to enable it to do its job correctly, we estimate in the region of 10 meters positive and 10 meters negative will be required. Due to the cost and weight of cable there is simply no logic in supplying it in the Kit, however, ***failure*** *to fit this cable will result in dramatic performance drop of this product.*

This can also be used on smaller camper vans where the cable requirements are not as demanding as a towed vehicle, larger battery to battery chargers are available for the larger motor homes.



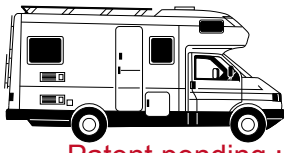
Remote control (optional)



Description	Part number
45A Full Tow kit Battery to Battery charger (inc 1 meter cables)	Tk1
Tow Kit Battery to Battery charger Remote Control (optional)	Tk1r
Extra 50A quick release 50A connectors set (2 units)	Qr50

Combined Batt. to Batt. charger and MPPT solar reg

Wildside Range



Patent pending :

IP68

Combined:

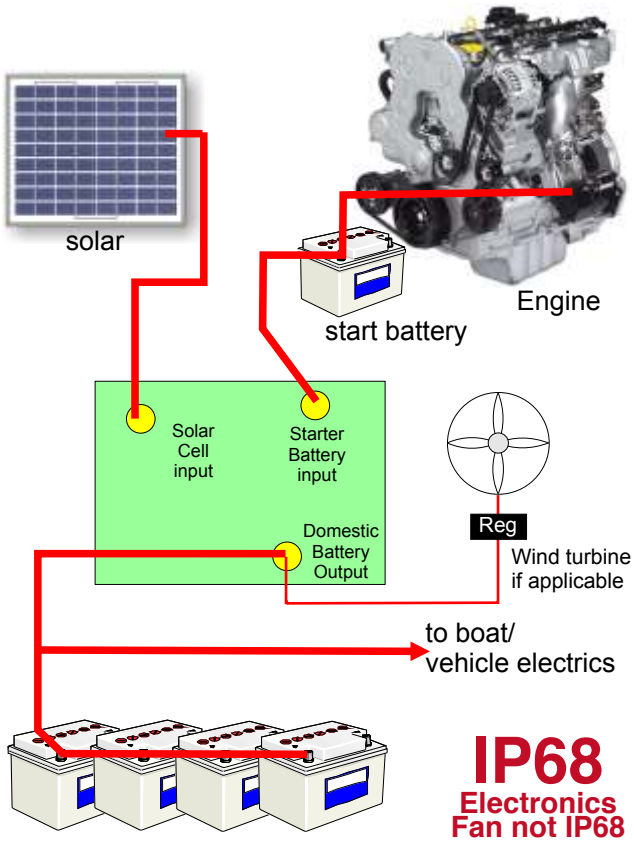
Battery to Battery Charger
MPPT Solar Regulator
Twin Solar Output

What is the Wildside range?
The Wildside range is a unique total package integrating the best MPPT solar regulator with a Sterling Battery to Battery Charger ensuring not only the maximum charge into your batteries when mobile (Battery to Battery charger) but harvesting the maximum power from your solar cells when stationary. Where required, both power sources will also seamlessly integrate when the total power can be used with extremely low quiescent current. Other benefits include the fact that the solar cell is diverted from the engine battery bank (when full) to your secondary battery bank with the engine battery set as the priority (not applicable if fitted to a caravan), also if there is a battery charger on your secondary battery bank it will also charge your primary battery bank through the system. It is also extremely easy to install and set up. This unit has all the battery type selection and adjustments as per the standard battery to battery charger and MPPT solar regulators.

Battery to Battery charger: If you do not know what advantages a battery to battery charger offers you over a conventional charging system please read the information on Battery to Battery chargers.
Solar regulator: (Type MPPT) If you do not know what advantages a Maximum Power Point Solar regulator offers you over a conventional solar regulator please go to the previous pages marked solar regulators to see what this has to offer. The unit will charge both the engine start battery (as the primary) so it covers all engine management losses during the winter and long lay ups. Any surplus power is directed into the secondary/domestic battery bank as and when the primary battery is taken care off. The engine starter battery is regarded as the primary for obvious reasons.
This product is ideal for the caravan, camper van and yacht market where solar cells are regularly used and where a high performance solar regulator is required along with a battery to battery charger.
This unique products saves a lot of time and money on installation and duplication of technology.
Note the maximum continuous refers to the current the unit will process, i.e. if you fitted a 16A unit with a 50A alternator or battery charger the unit would only process 16A, no damage would be done to the unit as the product is current limiting and would simply not allow more current through (not a wise choice).
Note that the minimum solar cell power refers to the maximum power the system will process, the cell array can be larger without damaging the product, as it is very unlikely that a solar cell will achieve the full power on a normal installation. If, for example, you had 300W on a 180W unit on a perfect day we would only process 180W maximum. However, on a less than perfect day and the power generated drops below 180W then that would be processed.

Which product suits your needs?
This is a little daunting, however, bare in mind getting it wrong will not result in damage to our product as it is current limiting. To match the product against your requirements you need to take various factors into consideration:
1) What is the maximum power of your alternator in amperes? We will use 90A for this example:
2) What is the size of your secondary battery bank? we will use 200Ah for this example.
3) What is the size of the solar cells? (if the solar cell's power is lower than the product rating then the solar cell power does not matter, i.e. If we conclude that we need a 60 amp Wildside (based on alternator size and battery bank size) which can support up to a 700W solar array then the solar cell size, if below that, is okay or even a little above it. However, if the solar cell array is 1000W+ then the 60A model would not maximise this and it would be best to use the 100A version as the solar power is so great as to make the alternator size not the primary / predominate power supply.

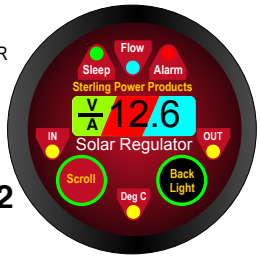
Things to bear in mind:
1) There is only so much you can fast charge into a battery, an open lead acid allows a fast recharge, gel, not so much. So, for a fast recharge, of say a 100Ah battery, there is not much point in trying to put more than about 30A into it (you could try 500A if you had it but the battery would simply not accept this current and reduce to 30A within a second or two). Therefore, with a 200Ah battery there is no point having much more than about a 60A unit as it would simply be wasted even if you had a 150A alternator. However, if, in the future you saw the time when you might put on a larger battery bank then it would be prudent to fit the 90A version as when the larger battery bank was installed then this unit would deliver that extra power effectively etc.
2) Down sizing is okay, for example: If you only have a 50A alternator on a vehicle or boat there is no point fitting a 100A unit as the most you will process is the 50A from the alternator as that is the limiting factor. In order to save money we would recommend rating the unit you require at a lower rating than the alternator output. Simply because you may, for example, have an 80A alternator, but at cruising speed or low RPM you may only produce 40A so the 60A model would be great for that size. However, you may only have 1 x 80A battery bank to charge, in which case the 60A would be too big to utilise that power, thus, a 16A or 30A would be ok.
I accept the above is some what confusing, however, if in doubt and the budget is not a problem biggest is usually best.



IP68
Electronics Fan not IP68

Remote control

OPTION, 52 MM HOLE CUT DIAMETER



Check web site for launch dates expected FEB 2012

Remote control features
1) Ammeter
2) Voltmeter (in and out)
3) Alarm buzzer (with ability to isolate)
4) Background light
5) Background light changes colour for different events i.e charging, discharging, warning, etc.

Voltage	Continuous Current	Quiescent Current mA	Recommended cell power W	Battery Bank size (domestic)	Size	Weight	Part number
12 V	16 amps	1 mA	250 +	up to 150 Ah	145 x 110 x 120	0.8kg	WS1216
12 V	30 amps	1 mA	450 +	up to 300 Ah	145 x 110 x 120	0.8kg	WS1230
12 V	60 amps	1 mA	800 +	up to 600 Ah	TBA		WS1260
12 V	100 amps	1 mA	1400 +	up to 1000 Ah+			WS12100
				Remote control	hole diameter 50 mm		RWS

145 mm Long, 110 mm Wide, 120 mm Tall

Battery - Battery Charger / Maintainer

Low power Mirror Charger

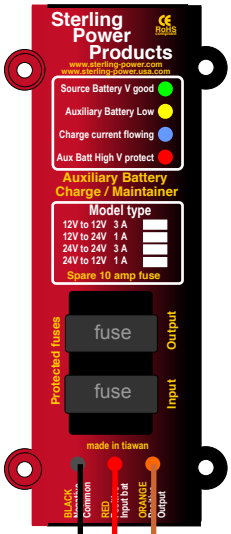
12-12 v 3 amp 24-24 v 2 amp
12-24 v 1 amp 24-12 v 1 amp

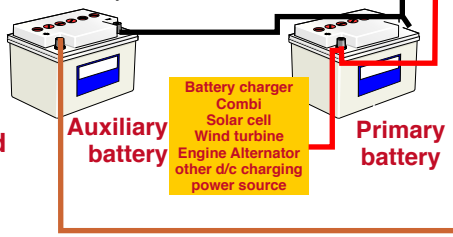
Save money on batteries and stop them from being destroyed by discharging. A flat battery means you need an expensive replacement .

The auxiliary battery charger maintainer is simple to install and is a low cost product. It is designed to enable extra battery banks on a boat or a camper van to be kept topped up from a separate battery bank which has, for example, a battery charger / wind gen / solar cell connected to it.

Why use this product instead of a voltage sensitive relay?
A voltage sensitive relay takes a relatively large amount of charge to hold in a relay. This is power you cannot afford if you are only producing low current (e.g. from solar / wind input). The **Battery Maintainer** uses FETs instead of relays and as such uses very little power itself (less than 1 mA) thus solar input can be more efficiently used. The Maintainer is also current limiting so the high load on starting would not affect it. Relays also have a limited life cycle and on low power generation a relay could be clicking 'on' and 'off' all day. However, with a FET control system there is no physical contacts to wear out and no noise produced. This Maintainer should not be used on a battery with a sustained heavy discharge/drain as it can't pass high currents. See **Voltage Sensitive Relays** or the **Battery to Battery Chargers section.**
A 100Ah battery at 50% discharge would take about 24-36 hours.

How does it work?
This unit is activated when the main battery has reached about 13.3V and allows excess power to be transferred from the primary charging system to charge/maintain an auxiliary battery bank.
Please note that this product has no fast charge / boost ability but simply mirrors the input voltage with a small voltage drop (depending on the current flow), the final charge voltage would be around 0.2V lower than the primary charge voltage. This is more than enough to keep a battery topped up and supply any small loads, such as: the battery internal discharge and the engine management system discharge (up to about 1A continuous). This product should not be used on a battery with a sustained heavy discharge or drain as it does not have the ability to pass high currents, for higher currents see the **Voltage Sensitive Relays** or the **Battery to Battery Chargers** sections of the catalogue.
This maintainer has the ability to charge and maintain the charge, even if the battery is low (in a long time frame for example a 100A battery at 50% discharge could take about 1-2 days) it would never do this if the current discharges from that battery is in excess of 2A.





Battery maintainer / charger inc 1 metre of cable

Input V d/c	Output V d/c	Amps	Size L x W x D mm	Weight kg	Part nos
12	12	3	140 x 45 x 40	0.25	BM12123
12	24	1	140 x 45 x 40	0.25	BM12241
24	24	3	140 x 45 x 40	0.25	BM24241
24	12	1	140 x 45 x 40	0.25	BM24121

IP 65 waterproof Ignition protected

Examples of where one would use this type of product successfully:

1)**Boats:** Trickle charge starter or bow thruster from domestic (if domestic is being charged) 12V to 24V, 12V to 12V and 24V to 12V configurations can be made.

2)**Camper vans:** Trickle charge starter from domestic (if domestic is being charged via charger/renewables) starter tend to operate engine ECU and tracker. Likewise 12V/24V configs

3)**Solar / wind top up:** you may have a solar cell or a wind turbine on the main battery bank and again wish to share the surplus power from this device to other batteries, thus maintaining them at a ready condition.

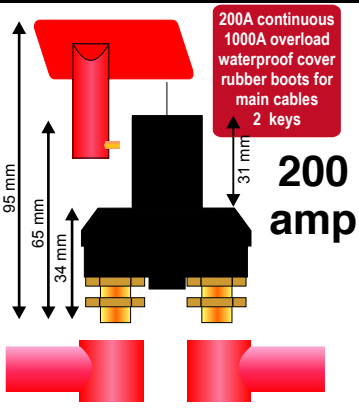
Specification

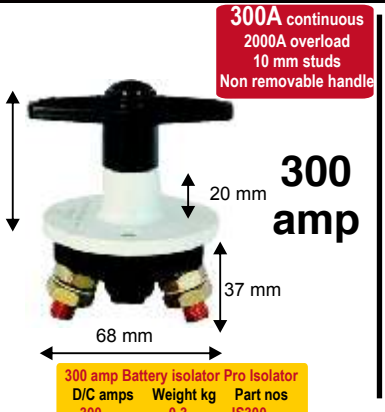
Power consumption in offline/standby is 0.001 amps approx 1 Ah every 40 days.
Power consumption online (normally not important but only important if a low power solar cell is being used) = 1 mA
A solar cell in excess off 1W would work through this without a problem.
High voltage trip 15V on aux battery bank (x 2 for 24V), high temperature lock down at 80 deg C.
Aux battery 'low voltage' warning LED on if aux bat below 12.6V and 'off' above 12.7V.
Voltage required to activate the device 13.3V input.
Voltage at which point the device switches off and on to standby 12.9V input
Reverse polarity protected (fuse).

Ancillary equipment

200 amp Battery isolator Pro Isolator

D/C amps	Weight kg	Part nos
200	0.1	IS200





300 amp Battery isolator Pro Isolator

D/C amps	Weight kg	Part nos
300	0.3	IS300

500 amp Battery isolator Pro Isolator

D/C amps	Weight kg	Part nos
500	0.35	IS500K

Electrical Specification: Meets IEC 1010 CAT111
D/C voltage 0-200 volts overload protection 600V
A/C voltage 0-500 volts overload protection 600V
D/C current 0-600 amps overload protection
A/C current 0- 600 amps overload protection
Resistance 0-200 ohms overload protection 400V
Continuity beeper
Data hold function
A/C frequency response from 40-400 Hz
A/C speck tested on sine wave 50/60 Hz
Compact yet heavy duty

D/C Clamp ammeter and voltmeter

D/C clamp metre plus multi meter

Size mm	Weight kg	Part nos
160 x 35 x 25	0.1	CLAMP1

D/C Voltage Probe & Diagnostics Tool

At first glance this low cost D/C voltmeter looks like any other one available anywhere, however, on closer inspection you will see it is not. Standard voltage probes only go to 14 volts and is unable to inform you if the advanced charging cycle is in progress or a system has failed and is overcharging your system. The extra 2 LED's are preset to give more useful information than the very limited standard ones. This is a Sterling product and is not available anywhere else.
Available in 12 and 24V versions.

D/C Voltage Probe and Diagnostic tools

D/C voltage	Size L x W x D mm	Weight kg	Part nos
12	100 x 20 x 15	0.25	TM12V
24	100 x 20 x 15	0.25	TM24V

Latching relay control

Highly versatile and efficient latching relay.
Programmable for 4 charging functions and ideal for *solar and wind*

Pro Latch R

85 mm x 90 mm x 80mm

Suitable for use as one of the following:
1) Split charger (VSR) relay / uni + bidirectional
2) Battery protect relay (over discharge and over charge)
3) Engine Start Protect relay

Why a latching relay over a conventional relay?

A conventional relay (such as ones used in cars to switch on your lights or control power distribution on boats etc.) These are by far the most common forms of relays produced, they are very reliable and relatively low cost yet inefficient. For instance, a standard 80A/12V relay would consume about 0.45A (staying on). So, with a 70 A alternator the consumption of 0.45A for the relay is of no real importance. However, if you are planning on using a 60W solar cell on a normal 'English' day you would expect approximately 0.4A of current all of which shall be lost across the relay, thus, rendering the solar cell useless. **So lets do the maths: with the engine off, a single conventional relay will consume in 1 day 0.45 A x 24 hrs =10.8 A. Per week = 75.6 A.**

A latching relay works in a completely differently way, instead of using power to "stay on " it locks into position, so no matter if the circuit is 'on' or 'off' it engages a locking device (latch) which consumes no power to hold that position. On the down side they cannot be used straight out of the box like a standard relay. This is because they need a control circuit to work the internal latching device. It only needs a short burst of power to pull the contacts from one side to the other then the power must be removed, this, in itself, needs a control circuit. Sterling's efficeincy is down to 0.0005A (0.5mA) where our competitors are at 4-12mA. **So lets do the maths: with engine off our latching relay with active control circuit will consume 0.0005 x 24hrs = 0.012A per day which is 0.084A per week.** Compared to a standard relay which uses 75.6A in a week a latching relay system will use nearly 1000 times less, and this is for only 1 relay, what happens if you need 2,3 or 4 on a larger installation, clearly this **low power consumption** latching relay is the only sensible choice if solar or wind is used to supplement the main alternator charging system.

12V or 24V is automatically selected by the product, If less than 16.5V is detected then the unit will power up as 12V, if more than 17V the unit will power up as 24V.
Fine voltage key trigger point adjustments, each function has factory preset voltage trigger points these trigger points can be customised. A magnetic swipe can be used to adjust from 10.4V- 15 V for 'on' voltages (x 2 for 24V) and 10.0V- 14.6V for 'off' voltages (x2 for 24V), you would perhaps customise these settings for lithium batteries.

Remote control

54 mm hole cut

Remote control functions
1) Input voltage
2) Output voltage
3) Optional water proof display, encapsulated electronics.
4) Various over ride to allow lights to be switched on for safety (only available with remote)
5) Sleep: power saver function
6) Audible alarm stop
7) Audible alarm disconnect
8) Back light option on/ off
9) Background light colour change depending on function.
10) Relay circuit opened or closed indicator
11) High voltage trip alarm and low voltage warning

Remote control allows access to all the relevant information, the panel comes complete with a 5 meter telephone type extension lead. The meter is in a standard 50 mm threaded housing. This is an optional product and is not required for the operation of the main product.

4 operational modes

1) Bidirectional + uni directional charging: (default voltage setting, on 13.3V, off 13.0V x 2 for 24V) If, after the engine is switched 'off', and there are solar cells or wind charging systems in the boat/vehicle then the ability to charge other battery banks becomes very important. Therefore, the power consumption of the splitting device becomes extremely important and so the latching relay comes into a world of its own. There is no limit to how many battery banks that can be charged. An *instant starter disengage circuit* is built in to prevent starter motor high current surge damaging the product. This open circuits the relay between activating the starter motor and the bendix engaging the fly wheel. On *Charge Mode* the unit is preset for either side activation, i.e. whichever side of the relay reaches the trigger voltage first will activate the relay in that favoured direction. For uni-directional the relay will only be activated by a voltage in excess of 13.3V (x 2 for 24V) on the input cable stud only, the output cable voltage will not activate the product. In the event that you need the output cable to do the activation simply reverse the cables.

2) Battery Protection Mode: (default setting, 'off' 12.0V, 'on' 12.3V x 2 for 24V) The battery protect system, protects a battery bank from premature and expensive destruction due to deep discharge or over charging. It only takes one accidental deep discharge of a battery bank to destroy that battery bank, a very expensive mistake indeed. This is most common on things such as hire boats or hire equipment. This leaves the owner with a large battery replacement bill. The battery protection relay disconnects the batteries at a preset limit in order to protect the battery bank. The unit has a built in warning system, i.e. it will switch the power **off** for 10 secs then back **on** for 1 min to give a reasonable warning to allow the operator time to complete a process, such as: start the engine or activate a battery charger to take place to help the situation (i.e. recharge the batteries). This could happen on a boat late at night so the extra minute allows someone to start the engine to recover the batteries. **The remote control is an essential requirement to reactivate the Pro Latch R after the relay has tripped.** For extra safety, the optional remote control gives the option to override the trip for 1 min in the case of emergency.
Remote isolation mode: by using the remote control the battery bank can be manually isolated if required.

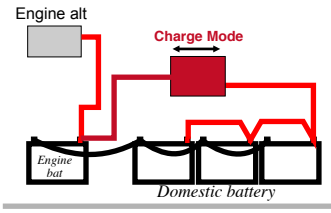
3) Engine Start protection mode: (default setting 'off' 12.4V & 'on' 12.6V)
This mode is designed to allow products to be safely run from an engine starter battery and to disconnect the product at such a stage as to allow the engine starter battery to retain enough power to ensure the engine will start. Refer to the **Start Pro** at the bottom of the next page.

Optional remote control for the above products, features include: LCD displays can be selected to show input voltage or output voltage. Other alarms/information displayed via LEDs would be: High voltage trip alarm (showing if fault on input or output) alarm set at 16V (x 2 for 24V), Relay engaged or disengaged - Emergency override function (hold select button for 5 sec to give 1 min override) - Audible alarm function disengage (especially boat or camper vans would not want alarms going off at 4 in the morning). Background light on/off (background light changes colour with cycle, red = warning, blue for online, green for offline - Sleep mode indicator - 1 min safety/ latch override ability.

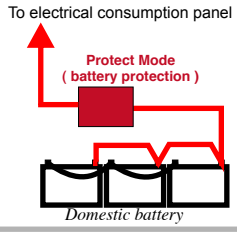
Part Number	Continuous Current	Max Intermittent Current	Quiescent Current mA	Input voltage	Output stud	Preset voltage (can be adjusted if required) Battery protect	Starter Protect	Charging mode
LR80	80	500	0.5	12/24 auto	6 mm	Off 10.9V on 12.8V	Off 12.4V on 13V	on 13.3 off 12.9
LR160	160	1000	0.5	12/24 auto	8 mm	Off 10.9V on 12.8V	Off 12.4V on 13V	on 13.3 off 12.9
LR240	240	1500	0.5	12/24 auto	8 mm	Off 10.9V on 12.8V	Off 12.4V on 13V	on 13.3 off 12.9
LRB80	80	500	0.5	B = Budget: Relay only available with a fixed/non adjustable factory setting, non-programmable				
LRR	Latching relay remote with 5 metres of cable, for longer use standard telephone cable extension.							

Examples of common applications for the Pro Latch R

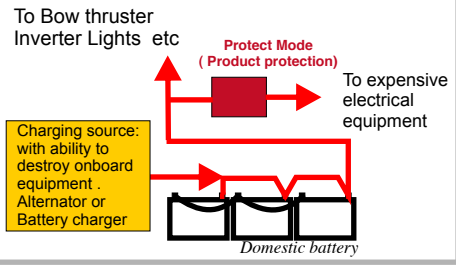
Voltage sensitive charging relay



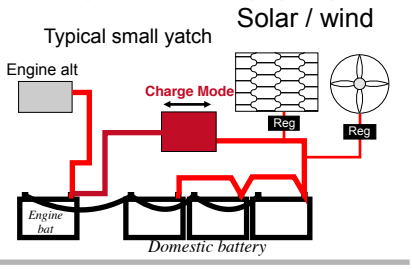
Battery protection



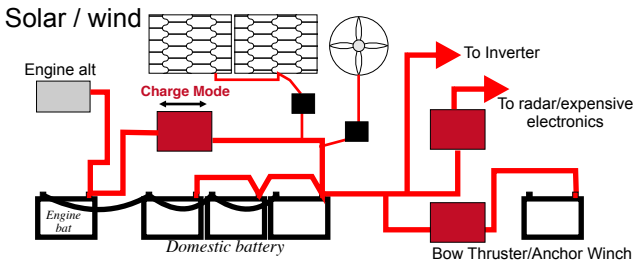
Product protection mode



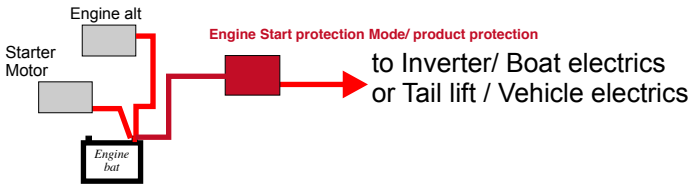
Voltage sensitive charging relay



Multiple use on small boat



Engine Starter Battery Protection Mode



Switching algorithm information:
All the 3 applications are not a simple 'on' / 'off' software control device, as a result, for convenience and ease of explanation, all control voltages are described as a specific voltage which are, in fact, a mean voltage which has a time and history element to the software algorithms. A different algorithm exists for each product and switching point in order to prevent unnecessary 'on'/'off' cycles where none are really required. Some control voltages, such as high voltage protection trips, are instant but all the others are not .

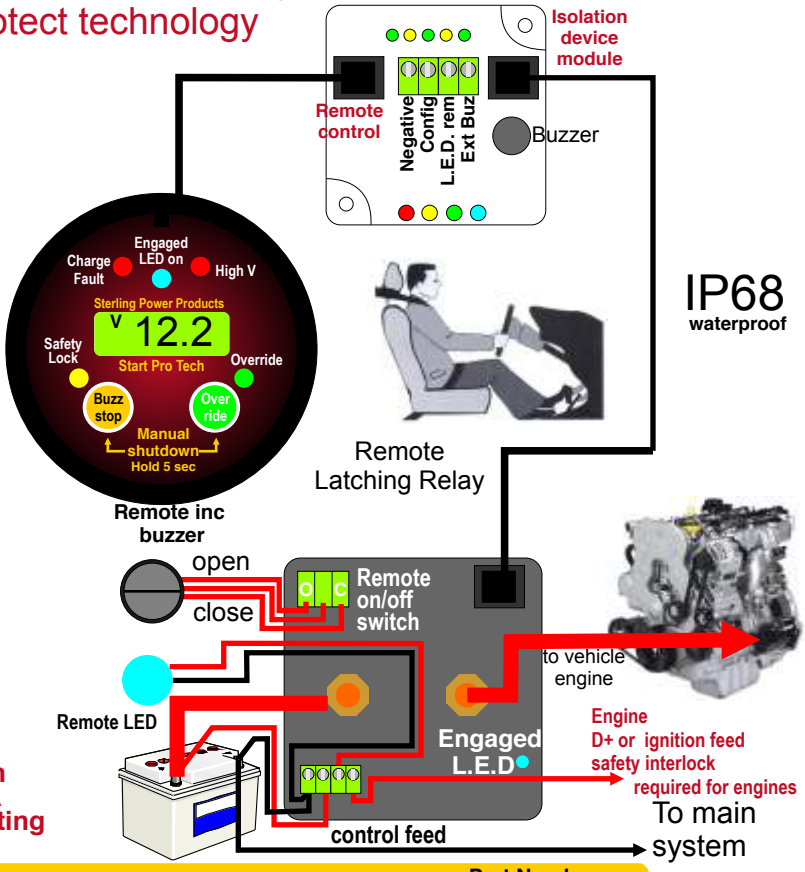
Start Pro Tech

A dedicated, combined flexible, automatic vehicle starter battery protection product. Preset voltage selected via magnetic reed switches from unit (no computer required)

Professional starting protect technology

The **Start Pro** is a dedicated, flexible vehicle battery protection product, with an extremely wide range of uses, the unit comprises of an isolated switcher box available in models from 480A to 640A continuous. The control box is common and options include more buzzers / lights and even a digital remote control panel giving voltages and other control options.
The control box comes preset with the default setting which would cover the vast majority of uses, however, using a built in magnet preset voltages and buzzer alarms (plus many other things) can be altered.
The product is waterproof (remote control, control box and main switching box all IP68) Easy to install with plug an play where ever possible.

Features:
1) Ignition fed interlock to prevent switch operation while engine is running. It also ensures product continues to remain engaged even if an alternator fails or a belt breaks (to get you home).
2) Dash mounted override switch to engage product to start engine via remote control head or switch if remote not required.
3) Digital lock code if required for security in remote head.
4) Buzzer built into the remote control to give a warning before the unit disengages.
5) Remote engaged light indicator 2 mA draw (fit or not up to you).
6) Remote control digital meter (optional) plus override functions for the more discerning installer, multi coloured display shows warnings in red, okay in green and charging in Blue.
7) Manual disengage for manual intervention if required to be used prior to auto switch.
8) 4 preset voltages which are easy to select, no computer required.



Description	Part Number
12V and 24V auto select auto activation box inc remote buzzer plus 10 meter cable	SPT1
This part number does not include the isolation switch or the remote control, you must chose one from the below list	
Optional (recommended if full features are required) Remote control plus 10 m cable	SPRC
Key Switch Option (for added vehicle security)	ELKS1
Remote Buzzer Option	BZ
Additional Momentary switch option (one included in SPT1 as standard)	ELS1

Select what size Sterling Electrical Latching Battery Isolator you require for the above product

Continuous rating (A)	5 sec (A)	30 sec (A)	vehicle (V)	Part number	Suitable for
240	1200	600	12	SP12480	vans and cars
240	1200	600	24	SP24480	vans and cars
640	3000	1600	12	SP12640	larger vehicles
640	3000	1600	24	SP24640	larger vehicles

Pro Split R

Zero Point Zero Volt Drop Intelligent Digital Alternator Power Distribution System.

This product uses a micro processor to monitor the multiple battery bank outputs which are to be charged by an alternator; it ensures the batteries are all charged in conjunction with each other and prevents any back feed through the device in the event of high loads on one battery bank. The system also has the ability to disconnect the alternator and individual battery bank outputs in the case of problems caused by the alternator or other power items in the system. It does all this and still offers only a max voltage drop of less that 0.01V, much less than any so called 0V drop mosfet / diode system. Many so called 0V drop systems simply do not come close, the Mastervolt battery mate is as high as 0.6V at full power (where it counts) while the Sterling is at 0.09V, a 500% performance improvement over the Mastervolt battery mate unit and about 1100% over a standard diode.

Faster battery charging Apart from the obvious charging benefits of the 0V drop across the unit which dramatically helps battery charging from the standard alternator, the Pro Split R has another unique feature to boost this ability even more. The main problem with split charge systems is that they are trying to charge 2 battery banks (or more). Usually one is already almost full (the engine battery) while one is empty (the domestic battery bank). The problem is that when you try to charge the 2 batteries with conventional splitting systems the higher voltage from the full engine battery fools the regulator on the alternator into thinking that the combined battery states are in fact better than they actually are. The trick is to isolate the engine battery (when it is safe to do so) so, the only voltage presented to the standard regulator is the empty domestic battery. This ensures a one on one charging experience between the empty battery and the alternator regulator which dramatically improves the regulator's charging performance into this battery bank. Then, when it's prudent to do so, we re-engage the engine starter battery at a level where it does not affect the maximum charge ability of the regulator.

How does the unit work? This unit on the surface looks like a simple device, however, this is a very complex software control device. Under normal operation the unit has a simple operating mode. Being engineers we are not only concerned about normal operation conditions, we also like to build into our products as much safety and control as possible to both protect your electrical system and to ensure the available power is directed to where it is required most.

What is the problem? Voltage drop across splitting systems (such as diodes) will cause poor performance when trying to charge batteries. This can be easily compensated for by using things like advanced alternator regulators or battery sensed alternators, however this, in itself, can cause problems (particularly with prolonged use and sealed batteries such as AGM and gel) with other batteries in the circuit, i.e. an over charge can take place, as explained in the diagrams below.
All boats have at least two battery bank outputs, some have three. These tend to be the engine start battery, the domestic battery bank (please note that if you join three or four batteries together in your domestic battery bank it is still one battery), and the bow thruster battery. Having introduced 2-3 battery bank outputs onto your boat, the problem then is how do you charge them from one alternator source (or two alternators which I will discus later).

Example 1 shows a typical split charge diode installation with a standard alternator with no advanced regulator nor battery sensing regulator. The test assumes a 60A alternator, the diode is 70A rated and there is an average cable between the alternator and the battery bank. The alternator voltage is assumed to be about 14.2V, however, in real life this could vary from 13.9-14.8 volts depending on the manufacturer and the internal regulator fitted to the unit. Important to note on example 1 is the fact that the alternator produces 14.2V at the alt but, by the time it gets to the domestic battery, there is only 12.8V left, this is an appalling voltage and would result in you having extremely bad charge performance at your battery bank. However, note that the engine battery is at 13.6V (this higher voltage is not an issue in this case but the phenomenon will cause a problem in later examples) this is because at 60A the voltage drop across the diode to the domestic battery is 1V, however, because the starter battery is almost full it is only drawing a few amps from the alternator and so its voltage drop is only going to be about 0.4A (remember the voltage drop across a diode is not linear but is proportional to the current flow, i.e. the more current flow through a diode the greater the voltage drop).

Conclusion: in example 1, there is no danger to anything but there is an appalling low charge voltage presented to the batteries making the charging system grossly ineffective.

Example 2 is replacing the standard regulator with a battery sensed regulator, this in effect, says to the alternator, give me 14.2V at the domestic battery bank (or at the end of the battery sensed cable) regardless of what voltage the alternator has to produce to achieve this goal. This will improve charge at the domestic battery a great deal, i.e. you can see that the voltage will rise on the battery from 12.8V in *example 1*, to 14.2V in *example 2*. However, when the voltage is checked through the system (and taking into account the voltage drops across the diodes) the engine battery voltage is now 15.2V, this would rise even more if the cables were longer i.e. if you had 4 or 5 meters of cables then the voltage drop in the cables could be up to 1V, this would drive up the starter battery by another 1V etc.
Conclusion: the starter battery should be open lead acid type as it is going to gas a little. In the short term the batteries would simply gas a little, and a regularly maintained battery would be ok. However, with a sealed, gel or AGM type any gassing could damage this type of battery.

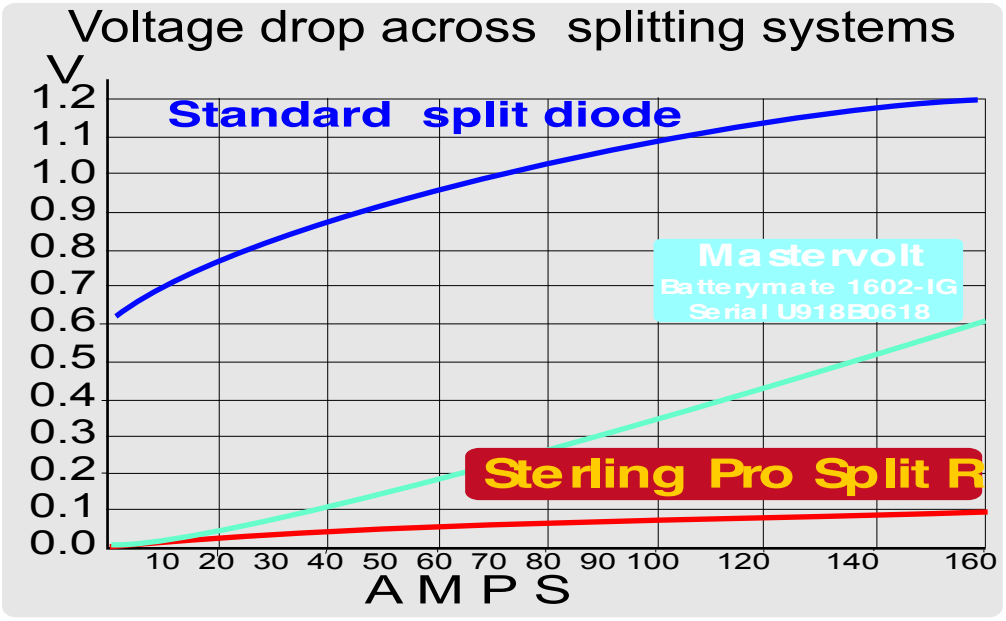
Example 3 is pretty much the same as example 2 except a modern advanced regulator will push the batteries up to 14.8V and in some cases the new calcium batteries could go as high as 15.1V. This simply adds another 0.6V onto *example 2* with the same conclusions, only worse.

The solution: Example 4 If the voltage drop across the splitting device could be eliminated then there would be no excessive rise in voltage on the starter battery. This way the gassing/high charge rate of the secondary would be the same as the domestic battery bank and under control. This would prevent excessive gassing taking place and causing excessive water loss in the starter battery. It also has many added features associated with this new technique.

Other advantages of the Zero Volt Drop Intelligent Alternator Distribution System

1) Distributes the most power to the battery bank which demands it.
2) Isolates a battery bank when there is any attempt to back feed the power from the full battery bank to a more demanding battery system.
3) Isolates full batteries to ensure empty batteries can charge faster from a standard regulator maintaining the engine start battery requirements as paramount.
4) Isolates the main alternator from all the batteries in the event of a failure of the alternator's own regulator. This prevents the batteries from boiling.
5) Isolates any battery bank which tries to back feed a high voltage from a different source. i.e. if there was a defective battery charger on one battery bank trying to back feed into another battery bank then the unit would disconnect that battery bank to save the others.
6) L.E.D. display shows which channels are in use and which are not.
7) Overload design, for example, our model rated for a 180A is actually continually rated for 240A with overload in excess of 2000A
8) Fail-safe, in event of unit failure the engine start battery and alternator remain connected, ensuring the safe running of the boat/vehicle. It prioritizes the engine start battery charging over all other battery bank outputs.

Competitors products: various other companies claim they have 0V split charge systems, however the so called transistors / mosfet's splitters when under load are only about 50% better than the standard low cost diodes, where as the Sterling is 90% better. We have a 0.09 volt drop under full load conditions as opposed to 0.6 V which the Mastervolt product has, making our product over 500% more effective. Plus, we offer all the extra functions as described above, which the transistor/ mosfet products simply cannot achieve.

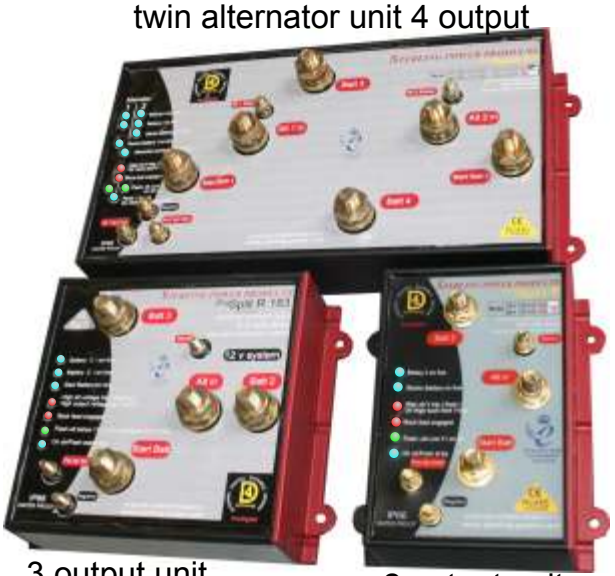


For 2 or more alts either use the twin unit or multiple alternators can be used on the single inputs as long as the total amps of the combined alternators does not exceed the rating of the product

Pro Charge Ultra 80-230 V 40-70 Hz A/C input					
D/C voltage	Max Alt Amps	Battery banks	Size L x W x D mm	Weight kg	Part nos
12	120	2	150 x 80 x 120	0.6	PSR122
12	180	2	150 x 80 x 140	0.7	PSR182
12	250	2	150 x 80 x 155	0.9	PSR252
12	120	3	150 x 80 x 130	0.9	PSR123
12	180	3	150 x 80 x 150	1.0	PSR183
12	250	3	150 x 80 x 180	1.3	PSR253
Twin 12	2 x 130	4	150 x 80 x 295	1.8	PSRT134
24	60	2	150 x 80 x 120	1.8	PSR62
24	100	2	150 x 80 x 140	0.6	PSR102
24	150	2	150 x 80 x 165	0.7	PSR152
24	240	2	150 x 80 x 250	1.2	PSR242
24	60	3	150 x 80 x 150	0.7	PSR63
24	100	3	150 x 80 x 175	1.0	PSR103
24	150	3	150 x 80 x 220	1.3	PSR153
Twin 24	2 x 80	4	150 x 80 x 295	1.8	PSRT84

Point zero volt drop / IP66 waterproof

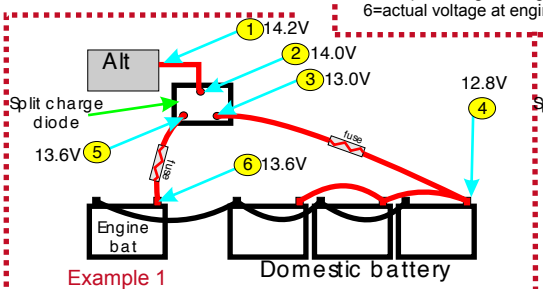
twin alternator unit 4 output



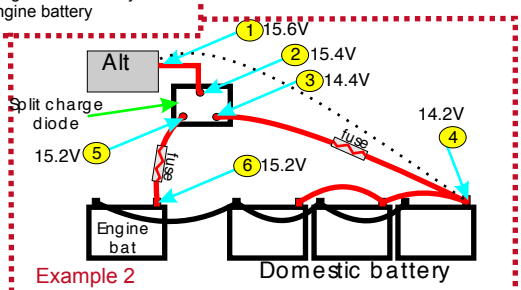
3 output unit

2 output unit

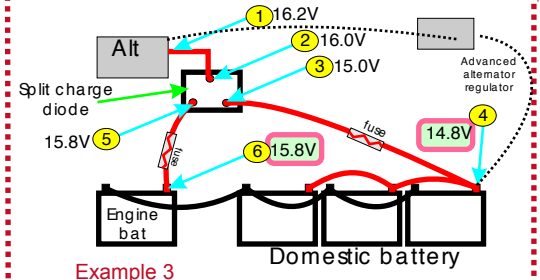
1= alternator voltage
2= input to diode voltage
3=output diode voltage to domestic battery
4=voltage at battery terminal
5= output voltage to engine start battery
6=actual voltage at engine battery



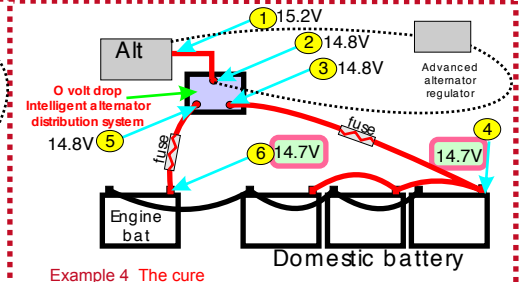
Example 1
split charge diode with standard alt producing about 14.2 V assuming a 60 amp alt , producing 60 amps into a empty domestic battery and a full engine battery



Example 2
split charge diode with Alternator with a battery sensing reg assuming an 60 amp alt , producing 60 amps into an empty domestic battery and a full engine battery



Example 3
split charge diode with Alternator with Advanced alt reg assuming a 60 amp alt , producing 60 amps into an empty domestic battery and a full engine battery



Example 4 The cure
Replace the split charge diode with a 0 volt drop intelligent alternator distribution system. Then with advanced charging systems the voltage on the domestic and engine battery remains the same

Relay Charging relays inc: Ignition Feed, VSR and CVSR

Pro Con IF Ignition Feed relay unit

IP68 Waterproof

Available in 12 V : 80,160 & 240 amps
24 V : 50,100 & 150 amps

gnition feed/D+/signal feed relay:
This range of low cost low signal activated relays is the simplest in the range, it offers the ability to link together as many battery banks as you wish and therefore charge different battery banks on a boat/vehicle when the engine is running.
Ideal applications: Boats with outboard motors and simple cabin batteries with no heavy loads on the cabin batteries, small vehicles/boats with auxiliary battery systems with low loads on the auxiliary battery bank which are not in excess of the rating of the relay so as not to overload the relay circuit.
Its limitations: There is no current limit with this type of device, so avoid using it on a system which have a high secondary battery load, such as a big inverter, anchor winch or bow thruster, as the surge currents associated with this type of equipment can destroy the unit (see current limiting relays for this application).
Starter battery interlock: this unit has the ability to interlock with up to 2 engines starter motors to ensure the relay is inactive when starter motors are engaged, thus protecting the relay and avoiding fuses blowing.
Start up time delays: a 30 second start up time delay prevents the relay coming on while the engine is being started , again protecting the relay circuit and preventing fuses blowing and damage to the relay.
Advantage over a standard relay: A standard relay has an activation feed via a cable. This feed takes about 0.5A to run, which adds the 0.5A to where you are taking the feed from, either the d+ on the alternator or key switch or oil pressure switch. This can place enough extra load on these circuits to cause a problem. There is also the secondary problem of voltage drop in the ignition feed cable affecting the relay. The Sterling IF product overcomes this by only using the ignition feed as a signal and takes no power from the ignition feed wire. The signal then activates an internal control system, which in turn activates the relay from main power circuit internally. This also has the advantage of not suffering from voltage drops in the feed line and allows the relay to run cooler. This unit is also waterproof and in a much safer package form. The package also contains anti-spark protection to help reduce the effect of back EMF from open circuiting the relay under heavy loads, without this relays will weld close if the unit is switched off under high current pass applications. The connection terminals are also high quality brass nuts and bolts gold plated and not poor quality crimp connectors which are not suitable for high sustained current flow.

Pro Con VSR Voltage Sensitive Relay 12/24 auto select plus fine adjust

IP68 Waterproof

Available in 80,160 & 240 amps
12/24 auto select

Voltage Sensitive activated relays:
This product would be regarded as the next level up from the signal feed relay (as above), the main difference being that it is totally automatic - this relay does not require an ignition feed to operate, it works on monitoring the input voltage to the device (usually the starter battery or battery bank with other charging source such as a battery charger or wind gen), when this voltage exceeds 13.3V the processor makes the assumption that the alternator/battery charger or other power device is active and as such it will automatically engage the relay to connect the main battery bank to the auxiliary battery bank and so charge the aux battery. Conversely, when the voltage drops below 12.9V the processor in the relay assumes that either the engine has been stopped or the load on the aux battery is pulling the starter battery down too much and for safety reasons it should be isolated. In a nut shell this is easier to install than the above and is smarter, however, it has some of the same limitations as the standard signal relay.

Ideal applications: See the above signal relay applications. Also ideal for charging a secondary battery bank from a battery charger which has only one output such as combined inverter charger. The starter motor interlock connection prevents the starter motor current being pulled through the relay and damaging the relay.

Its limitations: See the above limitations for the signal relay. Another major problem with standard relays is their ability to switch off under high load. The main job of a voltage sensitive relay is to sense any major current being taken out of the starter battery (primary) and to stop it. For example, if we take a typical 12V boat system with an 80A alternator and install a standard 80A VSR on the engine starter battery bank to charge the secondary battery (domestic battery bank, anchor winch or bow thruster battery bank). On engine start up the alternator will raise the voltage on the starter battery and this will engage the relay to charge the secondary battery bank (so far so good). However, for the sake of argument say the secondary battery bank is discharged (i.e. first thing in the morning) and then someone switches on a 2000W inverter, or a bow thruster or the anchor winch, these items will attempt to draw 200A + from the secondary battery bank. However, because the secondary battery is nearly empty, the load (the 200 amps) will automatically attempt to draw this current from the highest voltage source which, in this case, would be the starter battery bank. Obviously we do not want this to happen as we do not want to drain the starter battery or burn out the 80A relay or even worse set fire to the cables because you are now trying to pull 200A plus down these cables. In theory the large current flow through the VSR will drop the starter battery voltage and so trigger the relay to open circuit and so switch off this circuit stopping the drain and saving the day. However, a relay has 3 main ratings, for example, an 80A relay can take 80A all day no problem, (hence its continuous rating) and has a short term overload of about 400A for about 1/10th sec. It has a third rating, however, that is much more important; that is the maximum current it can open circuit at. The assumption by the public is that an 80A relay can open circuit at 80A, but that is not so, it has an open circuit current rating of about 30-40A. And so the problem becomes apparent, the high load on the secondary battery system (in the above example) causes an instant load of 200A + on the relay (that's ok, it can deal with this for a split second) then the control circuit attempts to open the relay to stop this discharge, then BANG you open the relay with 200A going through it (with an open circuit rating of about 40 amps) and so you cause a large back E.M.F. If you're lucky, it will vaporise the contacts blowing them in to small pieces and open circuit the relay destroying the product. To reduce this effect, Sterling puts anti back E.M.F. spark reducers on all relay products.

Adjustable : This unit comes factory set to bi-directional activation and can be fitted with no adjustments required to operate as a Voltage sensitive relay straight out of the box, it is auto voltage adjustment so it can be fitted to a 12 or 24V circuit, however, the following things can also be adjusted if desired.

Unit directional activation:

Function 1. Charging activated by starter battery voltage increase (engine on) This is the most common setting and the factory default setting. This setting also does not have an ignition feed requirement. This connects the primary and secondary banks based on a voltage in excess of 13.3V being sensed on the primary battery only (the engine starter battery). The 2nd battery bank, once connected would only disconnect when both battery banks drop below 13.0 volts on both sides. The 13V safety threshold is still activated to protect and seperate the batteries if, or when, the drain that invoked this function (voltage drops below 13V) once the unit has tripped, will not re-engage until the voltage on the primary battery bank (the engine start) has exceeded 13.3V again. No ignition feed required on this setting

Function 2. Charging either way(bi directional), based on a voltage rise on either side of the unit (default setting) This function will close the relay at 13.3V sensed on either side of the relay, a good example of this would be the use of a combi inverter charger on the domestic battery bank, because most combi's only have a single output charging line (to the domestic battery bank) then with this function the unit will charge from the combi to the starter battery bank (in effect giving you 2 outputs from the battery charger) when the combi is on, but also charge from the alternator to the domestic battery bank when the combi is off. In either mode the unit still has the 13.3V on and 13V off mode and the current limit function. No ignition feed required on this setting

Function 3 . Charging batteries one way only. This function allows a charge to flow from the alternator, or battery to battery charger, or any other charging source to a secondary battery bank, but only when the engine is running. In effect, this mode only allows current flow from the primary source to the secondary, and will continue to flow until either there is an overload threat or a low voltage threat to the primary battery or the engine is shut down. This function requires an extra wire to the unit, an ignition feed, that informs the unit if the engine is running or not.

Voltage parameter activation: Voltage activation and deactivation parameters can be adjusted using the setup command

Auto 12/24V selection, the unit will auto select the system voltage using the following, if it senses 4 to16V it will lock to 12V , if it sees 16-30V it will lock to 24V. If for some reason the input voltage is very low (in the case of an empty 24V system) then the product can be disconnected and allowed to re-engage, once locked the product will hold that setting until fully isolated again.

Both the VSR and the CVSR unit are fitted with the latest active progressive disconnect algorithm to ensure that the batteries can charge even where large differential voltages exist. As such there will be various time delays between what the customer has preset as the turn 'off' voltage point and the product actually turning off. The time delay will reduce the lower the voltage is below the programmed disconnect voltage.

Pro Con CVSR Current Limiting Voltage Sensitive Relay 12/24 auto select

IP68 Waterproof

Available in 70,140,210 & 280 amps
12/24 auto select

Current limiting Voltage Sensitive Relays: This range have all the adjustment abilities as per the above Pro Connect VSR.
These relays have built in current limiting, in a nutshell you can do whatever you want with them, if you overload them they simply switch off safely. The trick with a relay is not to open circuit when it is overloaded, but to remove the load, then open circuit the relay within its rating. With a current limiting VSR in an overload situation such as the example in the section above (Voltage Sensitive Relays) the 200A will surge through the relay for a split second (within the relay's capability), then the built in current limiting device will see this overload and reduce the current from the dangerous 200A+ to a very safe 6A, the relay will then safely open circuit with a 6A load and not a 200A load, and so protect the relay and your installation. Once the high load demand has been removed then the relay is safe to re-engage and continue doing its job.

ALL Inc rubber boots

Stud sizes
80 amp = 5 mm
160 amp = 8 mm
240 amp = 10 mm

Pro Connect IF 80,160 & 240 amp

Ignition Feed / signal feed Relay:

IP68
Waterproof

Ignition / Signal feed Relays				
D/C voltage	Amps	Size L x W x D mm	Weight kg	Part nos
12	80	140 x 60 x 40	0.025	IFR1280
12	160	140 x 70 x 40	0.030	IFR12160
12	240	140 x 80 x 40	0.030	IFR12240
24	50	140 x 60 x 40	0.025	IFR2450
24	100	140 x 70 x 40	0.030	IFR24100
24	150	140 x 80 x 40	0.030	IFR24150

Pro Connect VSR 80,160 & 240 amp
Voltage Sensitive Relays

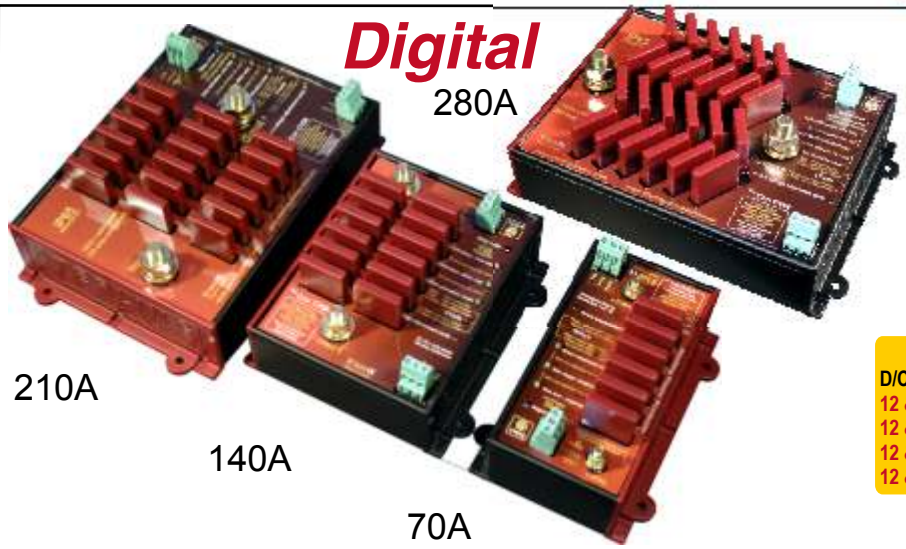
Voltage Sensitive Relays (adjustable)				
D/C voltage	Amps	Size L x W x D mm	Weight kg	Part nos
12 & 24 auto	80	140 x180 x 40	0.1	VSR80
12 & 24 auto	160	140 x190 x 40	0.2	VSR160
12 & 24 auto	240	140 x200 x 40	0.25	VSR240

Digital

IP68
Waterproof

The VSR and CVSR unit is fitted with the latest active progressive disconnect algorithm to ensure that the batteries can charge even where large differential voltages exist.
As such there will be various time delays between what the customer has preset as the turn 'off' voltage point and the product actually turning 'off'. The time delay will reduce the lower the voltage is below the programmed disconnect voltage.

Digital



Current limiting Voltage Sensitive Relays

C.V.S.R ratings
Continuous operating current of the VSR at 30 deg C = 80A
Continuos relay operating current at 90 deg C =70A
Instant overload current = 650A
Current limit after shut down current = 6A
At rest power consumption less than 1mA

IP68
Waterproof

Pro Connect CVSR 70 - 280 amps

Current Limiting Voltage Sensitive Relays (adjustable)				
D/C voltage	Amps	Size L x W x D mm	Weight kg	Part nos
12 & 24 auto	70	140 x120 x 40	0.1	CVSR70
12 & 24 auto	140	140 x180 x 40	0.2	CVSR140
12 & 24 auto	210	140 x210 x 40	0.25	CVSR210
12 & 24 auto	280	140 x240 x 40	0.25	CVSR280

Which model suits my needs best ?

1) The first part is easy, what is the max size of your alternator or charging device. I.e. do you have a 90A alternator or a 100A battery charger charging the primary battery bank. This means that the secondary battery could be subjected to at least that load, so, the relay must be able to comfortably handle that sort of current continuously. It would be wise to give the relay a good 10-20% comfort zone, i.e. always up-size the relay if the charging source and relay are the same, for example, if you have an 80A alternator, combi or battery charger with an 80A relay then go to the 160A relay option to be safe.

2) Next its cost of installation and ease of installation. If you are fitting the unit and access to ignition feeds is simple then the Ignition Feed system should be entertained, however, if not then the Voltage Sensitive Relay version is much simpler to fit and totally automatic, and has a lot more functions.

3) Do you need to vary which side of the relay activates the unit, or even ensure the unit is isolated (via ignition feed, or even adjust the standard voltage parameters, all this is possible on the Voltage Sensitive Relay)

4) The last, but most important aspect is safety. The most important thing here is to establish what the maximum possible load is that could be placed on the secondary battery bank when the relay is engaged, i.e. a large inverter/anchor winch, bow thruster. Remember that every load you put on, the secondary battery will have a % of this load transferred to the primary battery depending on how full the secondary battery is. This could range from a few percent to 100 percent, so, it is important that the relay system can deal with this high load without damage. If there are large potential loads such as hundreds of amps then the only way to do this is using a Current Limiting Voltage Sensitive Relay because when exposed to excessive currents, the current limiting models simply and safely shut down until the excessive current is removed, i.e. switched off, then it can automatically re-instate itself and carry on after that large surge load has stopped. This removes the need for excessive cabling and ensures a safe installation with less reliance on fuses for protection.

Pro Connect **CVSR**
Pro Connect **VSR**
Pro Connect **IF**

Sterling product features check list

	IF	VSR	CVSR
0.01 volt drop	●	●	●
Ignition feed (not always required)	●	●	●
Water proof to IP65	●	●	●
SAEJ1171 ignition protected	●	●	●
High overload surge rating	●	●	●
Back EMF spark arrester	●	●	●
1 LED information display	●		
Remote LED connection	●	●	●
No ignition feed voltage drop	●	●	●
Suppression diodes across relay to prolong life	●	●	●
Time delay to prevent engine starter damage	●	●	●
Single & Twin Starter motor disengage connections	●	●	●
12 V and 24 V automatic selection		●	●
Extremely Low Quiescent current approx 1 ma		●	●
Custom Voltage adjustment parameters available		●	●
Active progressive disconnect algorithm		●	●
Automatic voltage activation		●	●
Automatic voltage de activation		●	●
Protects primary battery from discharge		●	●
Emergency auxiliary forced activation		●	●
High battery voltage trip protection		●	●
5 LED information display		●	●
5 alarm functions and safety trips plus information		●	●
Adjustable relay trigger side operation		●	●
Short circuit protection (prior to engagement)		●	●
Current limiting protection			●

Voltage sensitive relay analogue vs digital

There are 2 main types of voltage sensitive relays on the market, by far the most common is the lower cost analogue model (The Sterling analogue model has the added advantage of 8 mm stud connectors and **IP68** rating (fully waterproof)), this type of device is very basic and simply switches **on** and **off** between two preset voltages with a 40 or so second time delay. This product works fine for the majority of installations where the second battery banks is only being charged when the engine is running and there is no real current drawn from the second battery set while the vehicle is on the move, ideal for most vehicle operation, however, things get more complex where there is current being drawn while the engine (on a boat or while a vehicle is not moving but the engine is running) or the batteries are the more exotic batteries such as AGM are being used (where different voltage switching is required) then the limitations of the analogue (no adjustable aspect) unit can be over come with the more expensive but much more controllable digital unit. The digital unit offers the operator a wide switching voltage range to chose from ensuring the open circuit voltage is above the discharge voltages of AGM, Gel and lithium, also the unit's bi-directional features may be required, and last but by no means least a switching algorithms is used to prevent unnecessary switching of the relay. Also, because a digital unit is active all the time the quiescent current of the product is vital, i.e. the current it takes to run the product, in the case of the Sterling is less than 1 mA that's 0.001A which is about 1A per week usage.

Why would I want to adjust a voltage sensitive relay?

1) Most Analogue VSRs come preset (for 24V x 2) to engage at 13.3V and disengage about 12.8V. Where as this is ok for normal lead acid batteries an AGM, Gel and Lithium battery have a much higher surface which will require adjustment voltages as high as 13V, this makes standard relay settings incorrect and will require the thresholds to be adjusted up. Batteries would be partially discharged at this voltage and would require switching off at about 13.2V. This could not be achieved with a fixed analogue model but there is no problem with the digital.

2) Directional control, Most analogue VSRs are preset as Bi-directional activation, i.e. if either the second battery or the first battery reaches the required trigger voltage the unit will work, however, there are times when the system wants to have the unit activated from the first battery but not activated from the secondary battery, this is called unidirectional, the digital version can do this.

Digital

The digital unit has a unique built in magnetic program ability, the lid of the unit has an in built magnet and the unit has an internal reed switch to pick up the magnets pulse generated by the user when the unit requires reprogramming this allows the product to be totally programmable by the lid but still maintained the waterproof integrity.

This unit is fitted with the latest on/off algorithms to prevent unnecessary switching, and has an extremely low quiescent current of less than 1 mA

What size of relay do I require?

To match a relay to your system the important things are

1) Ensure the amp ratings of the relay 10 - 20 % is larger than the largest charging source.

2) Ensure no load on the secondary battery bank exceeds the rating of the relay when on.

In the event of having a large load such as a 2000W + inverter, anchor winch or bow thruster then please look at our range of **Current Limiting Voltage** sensitive relays to deal with these high loads.

If the relay is to be used on a battery bank with a solar cell which is required to charge other batteries when the engine/battery charger is off then please look at the **Latching Relay** products as this is more suitable for that operation.

Analogue
Fixed program

Engage 13.3V
Dis-engage 12.8V
(x2 for 24V version)
Delay 30 sec

8 mm stud connectors

88 x 90 x 90 high

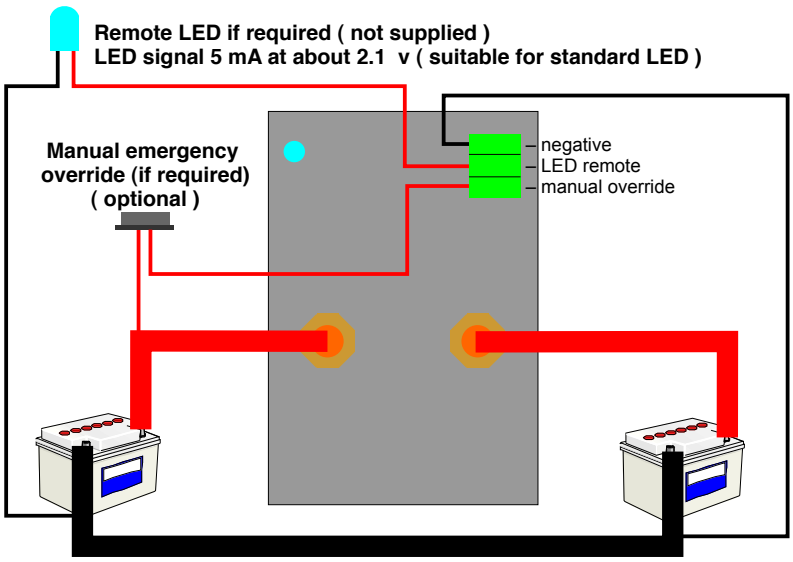
Product		Continuous current	Overload ability	Part Nos
80 amp	12v	80 amps	200 amps	VSRA8012
160 amp	12v	160 amps	400 amps	VSRA16012
80 amp	24v	80 amps	200 amps	VSRA8024
160 amp	24v	160 amps	400 amps	VSRA16024

Digital
Adjustable Program

Preset voltage
on 13.3V
off 13V
(x2 for 24V)
Quiescent current 0.001 amps
Online current 0.2 amps

8 mm stud connectors

88 x 90 x 90 high



Product	Continuous current	Overload ability	Part Nos
80 amp 12/24v	80 amps	200 amps	VSRB80
160 amp 12/24v	180 amps	400 amps	VSRB160

Digital control	Analogue control	
●	●	IP68 waterproof
	●	Fixed voltage switching
	●	Fixed time switching delay
●		Digital algorithm switching delay
	●	12 or 24V unit only
●		Auto select 12 and 24V unit
●		Adjustable switching voltage settings
●		High voltage disconnect
●		Low voltage warning
●	●	Anti relay contact arching protection
●	●	High quality brass connections
●	●	Relay electrical override ability
●		3 LED information rail
	●	1 LED active information
	●	Bi directional operation only
●		Adjustable Uni or Bi directional
●		Reverse polarity protection

Split charge Diodes & Battery De-Sulphation device

All boats have at least two battery banks, some have three. These tend to be the engine start battery, the domestic battery bank (please note that if you join three or four batteries together in your domestic battery bank it is still one battery), and the bow thruster battery. Having introduced 2-3 battery banks onto your boat, the problem then is how do you charge them from one alternator source (or two alternators which I will discuss later).
There are four various options employed by boat builders, below are the options with a short explanation giving both the positive and negative aspects.

1) Rotary switch. This method is very dated and not very common on boats. It is recognisable as a large circular switch with four marked positions on the switch. It is marked, off, 1, 2 and both. The good side of this system is that it is easy to install. The bad side is that it needs constant human intervention to ensure it works. Failure to operate it correctly will result in all batteries being discharged or not being charged correctly and possible damage to the alternator. They also tend to suffer failure if large prolonged current is passed through them. The spring in the switch can over-heat and loses its tension; this leads to an exponential break down of the switch that manifests in heat. When these switches fail they tend to melt the plastic case (if you are lucky). Simply check the temperature of the switch every so often by touching the back - it should be cold.

2) Split charge relay. This system is both dated and extremely dangerous, unless understood and the correct relay used for the correct job, ie current limiting relays may be required for safety reasons. The good side is, that it is easy to fit and requires no alterations to the standard engine system, but, it merely connects the domestic battery bank to the engine battery via a relay, which is energised when the engine starts.
The bad side (and the very dangerous side) is that a relay is prone to over loading. Say, for example, you have a 70A relay on your system and a 55A alternator, all seems great, but if you fit a 1500W inverter which can draw 150A and one morning the domestic battery is flat. So, you start the engine to charge the domestic batteries, the 70A split charger relay will come online to enable the alternator to charge the domestic battery bank. Then you load your inverter to 150A, the 150A will not be drawn from the domestic battery because it is flat but can be drawn from the engine battery (which is full). That means you will draw 150A up the split charge cable and through the 70A relay. If you are lucky you will destroy the relay, if you are not so lucky then you will set fire to the cross over cables, hence the dangerous aspect, A Sterling Currint limiting relay prevents this problem. (see later) The system must be suitable for the purpose for which it is installed and this is clearly not.

3) Split charge diodes: By using a set of diodes on a heat sink, one can ensure no back feed through the diode, thus ensuring that high currents from other battery banks do not flow up the charge lines and cause a fire. This is the most common method by far employed round the world and is the standard in the USA, for 3 reasons, safety, safety and safety, by the way did I say safety? However, all is far from perfect. The big down side with a split diode system is the voltage drop across the diode (in the order of 0.8-1.2V). This dramatically reduces the charge rate of the alternator on average by about 70%, however, this can easily be over come using products such as the Advanced Alternator regulator in conjunction with the Split Diode.

4) 0 volt-splitting systems: These are electronic devices using a control circuit and driving mosfets. The end result is a very low voltage drop across the splitting system (in the order of 0.04 -0.6V) but no reverse current flow is permitted due to the operation of the mosfets. However, on standard marine engines it is much more effective to employ the lower cost diode where an advanced regulator is fitted, (see performance).

5) 0.0 volt splitting system, The new Pro Split R from Sterling has a voltage drop about 1/10 that of a split charge diode and 1/5 that of a 0 volt drop mosfet system. See Pro Split graph below.
Conclusion: Test 1: From fig1 we can see the voltage drop across different splitting systems. This directly relates to the ability to charge the batteries, the larger the voltage drop across the device, the less effective the batteries charge.
Test 2 shows the clear advantage of using advanced regulators in conjunction with a conventional split charge diode. The advanced regulator automatically compensates for the voltage drop across the diode, plus the high charge 4-step program further increases the charge rate. The illustrated tests were on a 300 amp hour battery bank, but can easily be extrapolated to 400 amps plus.
The best low cost system clearly is a standard low cost split charge diode (for safety and cost) or the new Pro Split R and an advanced regulator on the alternator to compensate for the diode faults and charge at the constant current charging curves. This, not only charges 2-3 times faster (on a good installation, but much higher on a bad one) but puts about 100% more useful power into the batteries.
The best system but a bit more expensive is the new Pro Split (see next page)
For a twin alternator system, the ideal system is: on the largest alternator, fit direct to the

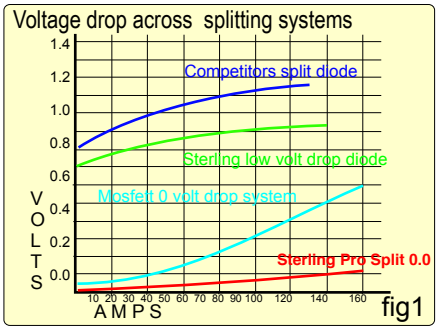


fig1

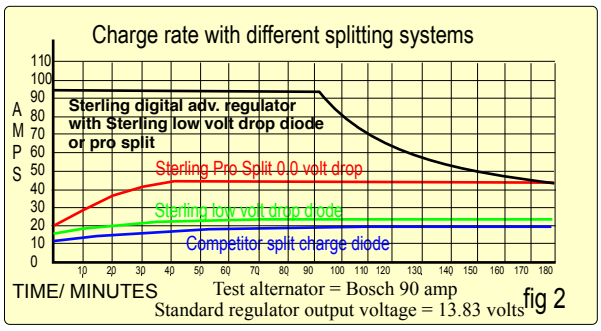


fig 2

Pro Split D

Split Charge Blocking Diodes 70-200 amps, 2-3 outputs

Sterling Power has developed a range of low cost split charge diodes. These diodes have enhanced performance over conventional diodes and at a lower cost. The difference is in the devices. All other split charge diode manufacturers use conventional alternator diodes, which at low current flow have about a 0.93 voltage drop. When the full rated current of these diodes is approached, the voltage drop increases to about 0.95 volts. This results in excessive heat and power loss across the diode. For example: A conventional one alternator in and two battery bank out, tested against a Sterling unit had the following results:

	CONVENTIONAL SPLITTERS				STERLING SPLITTER			
AMPS PASSED (A)	30	50	60	70	30	50	60	70
VOLTAGE DROP (V)	0.93	0.95	0.97	1.1	0.78	0.75	0.74	0.74
POWER LOSS (W)	27.9	47.5	58.2	77	23.4	37.5	44.4	51.8

Low voltage drop split charge diodes

Alternator inputs	Battery banks	Max alt current	Code
1	2	70	D70A2
1	3	70	D70A3
1	2	90	D90A2
1	3	90	D90A3
1	2	130	D130A2
1	3	130	D130A3
1	2	160	D160A2
1	3	160	D160A3
1	2	200	D200A2
1	3	200	D200A3

The Pro Pulse is designed to connect to a 12 V battery bank. This unit reverse feeds a small electrical pulse back into the battery which prevents and also reverses sulphation on the battery plates.
By keeping the plates clean and free from sulphation the battery stays fresh and responsive to charging and discharging.
If you have been replacing batteries because they are not holding their charge then in most cases the battery is, in fact, in good condition except the plates are sulphated. Sulphation acts like a waterproof coating over the plates preventing the plate area effected being active and contributing to reduction in the battery cell performance. The solution is to remove this sulphation and expose the plate to the battery process again. The Pro Pulse should be fitted to any battery bank to ensure that sulphation is not only prevented but also reversed and so prolong the life and performance of the battery bank.
This device is not required if you have a Pro Digital battery charger or any other advanced Sterling charging product connected to your batteries as they have a de-sulphation cycle built into their software program.
This is not a battery charger and it cannot actually charge your batteries it is a de-sulphation device.

	Size mm	Weight kg	Part nos
De-supphation unit 12 v up to 150 amp hr bat bank	100 x 90 x 30 H	0.2	PP12V
De-supphation unit 12 v up to 150 amp hr bat bank (IP68)	90 x 90 x 60 H	0.2	PPW12150
De-supphation unit 12 v up to 500 amp hr bat bank (IP68)	90 x 90 x 60 H	0.2	PPW12500
De-supphation unit 24 v up to 150 amp hr bat bank (IP68)	90 x 90 x 60 H	0.25	PPW24150

Pro Pulse

Battery De-sulphation & maintenance device

Original
12 v up to
150 amp hr unit

Connects direct to battery
No external power source
Reverse feeds high frequency pulse
Battery to blow sulphation off the plates
Prolongs battery life by up to 100%
Rejuvenates older batteries
Sharpens battery response to accept faster charge
Preserves cold start performance
Suitable for use on all vehicles and boats
New waterproof IP68 model encapuslated

New
more power full
IP68 waterproof
model 12 v 150 & 500 amps hr
and 24 v 250 amp hr

Electrical Latching Battery Isolator 160-640A IP68 waterproof

Electrical battery isolators are used to switch the main pos or neg d/c cables which are connected to a battery bank, the idea being to be able to isolate the battery bank remotely or automatically to preserve the charge in the battery bank or prevent a fire in an emergency situation, thus, ensuring that no drain takes place while the system is switched off. Isolators are commonly used on boats, camper vans and emergency vehicles or, in some cases, for emergency switching i.e. In a racing car it may be required to isolate the battery in the event of an accident.

The key features to look for in this type of device is the continuous rating of the product, its overload rating (i.e. if the engine start is being used through the device) making sure the product uses 0A when off and, when online, negligible amounts of power is consumed (Sterling uses a small amount of power to run an LED). There is only a small draw of about 2A for about 1/4 of a second during the crossover event.
This product comes complete with a remote spring load switch with an LED (on) remote and local indicator, which can be deactivated if power loss is a priority.

Large 8 mm (on smaller units) and 10 mm (on larger units) studs ensure good contact for electrical cables, with the product potted ensuring IP68 so the product can be mounted anywhere.
These are 12 or 24V, however, due to the low instantaneous power consumption of the switching mechanism you can tap the voltage from a higher voltage battery to use a lower rated product i.e. if you only have a 12V unit and a 24V battery bank then simply tap 12V off the 24V battery. If you have a 48V forklift then simply tap off 12V or 24V depending on the unit.

Isolated switching and control circuit:
The control circuit is totally isolated from the switching circuit, this is extremely important and means that the unit can switch on the negative or the positive of the battery. Also the battery it switches need not be the battery where the control voltage comes from. I.e. you could have a 12V control system with a 36V battery bank you wish to switch, this is not a problem.

Latching relay technology:
This is very important because along the control voltage is 8-32V to operate the switch, because such little power is used to operate the switch it can easily be used on up to 48V (and higher) systems. As you can simply tap off 12V to operate the control circuit without any fear of damaging a larger battery bank.

D+ alternator or ignition feed safety interlock circuit:
The biggest fear with an electrical battery switch (as with a normal manual switch) is that because it's so easy to use then if someone switches off the switch with an engine running, this could cause massive damage to the engine and the alternator. The Sterling unit has an alternator D+ interlock which, if connected to the alternator's d+/61 or other ignition feed stops the switch from working. I.e. if the engine is running the switch will not operate until the engine ignition is switched off or the alternator is powered down. This minimises the risk of any potentially expensive damages to the vehicle's alternator or engine's management system.

Multiple operational points:
This product is designed to be totally flexible with no real limitation as to how many points the product can be operated from, simply purchase more momentary switches if required.

Key lock optional: the unit comes with a momentary rocker switch to operate the unit, however, one can purchase a key lock option if required.

Rating: The products rating are their continuous rating i.e. full current all day, this can be used to calculate if the product is suitable for aux battery systems such as marine domestic battery banks or vehicle secondary battery banks. Simply ensure that the continuous load application does not exceed the rating of the product.

Cold cranking/ engine start: This is a very hard aspect to rate a product for as there are so many factors. Most of which the operator would not be able to ascertain and, as such, we need to give rough guidance, these products have a very large overload rating, especially the 5 second rating (cold cranking). The 160A model would be on the edge for cold cranking but ideal for most auxiliary battery isolations, a small petrol engine such as a marine outboard would be okay but a diesel van may be too much, it is best to start at the 320A version if an engine start is required.

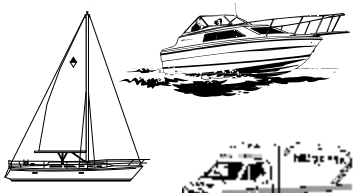
Other relevant products for isolating your engine and/or protecting your alternator is Sterling's **alternator protection device.** This can be fitted to the engine's alternator so that, in the event of accidental switching, then the engine's alternator will be protected.

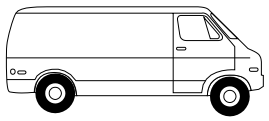
640A continuous
2400A intermittent

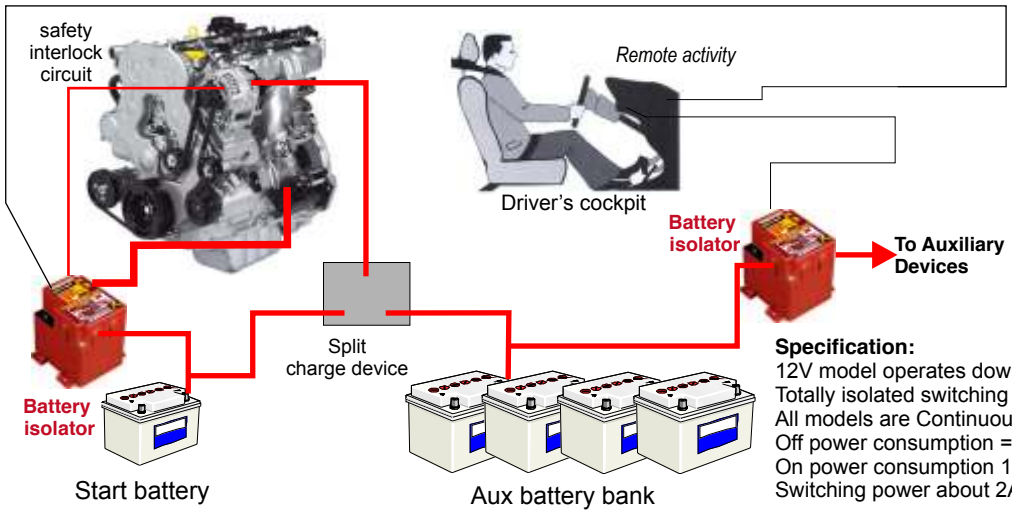
both inc 3 way momentary rocker switch plus engage lamp extra rocker switches available for multiple operational points

160 and 320A continuous
1200A intermittent

Key switch optional extra for added security







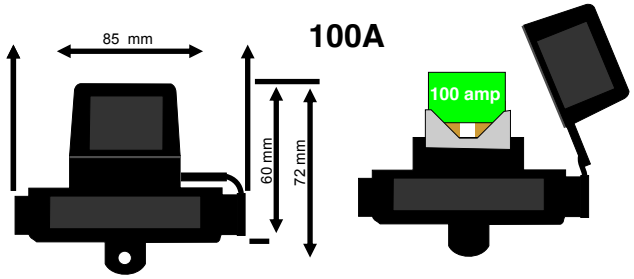
Specification:
12V model operates down to 8V / 24V models down to 16V
Totally isolated switching voltage from control voltage
All models are Continuous current rated
Off power consumption = 0.000A
On power consumption 1.5mA - 0.0015A LED Consumption
Switching power about 2A for 0.5 seconds

Electrical Battery Isolator

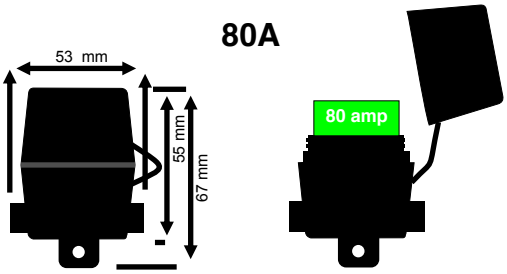
Continuous rating:	5 sec	30 sec	starter rated	Size	Weight	Power con	Control voltage	Part number
160 Amps	1500 A	600 A	Not suitable for engine start	80x90x90H	0.2 kg	0 amps	12 v	ELB12160
160 amps	1500 A	600 A	Not suitable for engine start	80x90x90H	0.2 kg	0 amps	24 v	ELB24160
320 Amps	3000 A	1200 A	Car & small van ,Petrol boat	80x90x90H	0.2 kg	0 amps	12 v	ELB12320
320 amps	3000 A	1200 A	Car & small van , Petrol boat	80x90x90H	0.2 kg	0 amps	24 v	ELB24320
480 amps **	4500 A	1800 A	lorry, diesel Plant up to 600hp	150x100x120H	0.4 kg	0 amps	12 v	ELB12480
480 amps **	4500 A	1800 A	lorry, diesel Plant up to 600hp	150x100x120H	0.4 kg	0 amps	24 v	ELB24480
640 amps **	6000 A	2400 A	lorry, diesel engines up to 1000hp	150x100x120H	0.4 kg	0 amps	12 v	ELB12640
640 amps **	6000 A	2400 A	lorry, diesel engines up to 1000hp	150x100x120H	0.4 kg	0 amps	24 v	ELB24640
Extra momentary switch (one supplied standard in each kit)								ELS1
Key operated switch with 2 keys (optional extra) Please note only momentary switches can be used with this product								ELKS1

** These unis can be used in conjunction with the automatic control box for use with the Start Pro Tech product if you want a auto upgrade

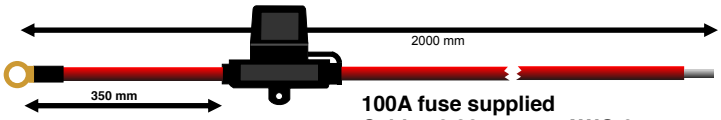
Pre-made Pre-fused (waterproof) 80A and 100A



IP66
WATERPROOF
IF INSTALLED
VERTICALLY
AS PER DRAWING



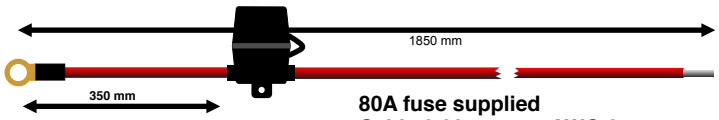
Cable available in Red or Black, fuse container Black only



100A fuse supplied
Cable 13.33 mm sq AWG 6
Total length 2 metre
8 mm ring terminal
Tin soldered other end

Part Number	Description
FRAWG6	Pre-fused (100A) Pre-wired, (2m), RED, AWG 6, 13.3 mm2
FBAWG6	Pre-fused (100A) Pre-wired, (2m), Black, AWG 6, 13.3 mm2

Cable available in Red or Black, fuse container Black only



80A fuse supplied
Cable 8.33 mm sq AWG 8
Total length 2 metre
8 mm ring terminal
Tin soldered other end

Part Number	Description
FRAWG8	Pre-fused (80A) Pre-wired, (2m), RED, AWG 8, 8.3 mm2
FBAWG8	Pre-fused (80A) Pre-wired, (2m), Black, AWG 8, 8.3 mm2

DC-DC converters waterproof IP68 10 and 20 amp 24V-12v

145 mm Long, 110 mm Wide, 120 mm Tall

AQUANAUTIC
Waterproof range

This new range of 24-12 v DC DC converters feature a **fully waterproof package plus continuously active or ignition on/off**, ideal for marine or truck use where one is not always able to find that perfect dry position to install the product, the product offers 2 install options

1) **On all the time.** where the product works between the voltages specified and is not controlled by the engine being on or off this requires a stand by current consumption of about 20-30 ma = 0.02-3 amps - about 4-5 amps per week

2)**Manual or ignition feed activation** option where the product is activated by ignition feed from the engine or a separate switch the advantage of this is the total removal of the stand by current consumption to 0 amps, ideal where vehicle is involved in long term idleness, or you only want the 12 v when engine is running or other pre determined times.

Not suitable for charging aux battery systems , this is not a low cost Battery to Battery charger or other advanced charging type products we make and should not be confused with the much more complex and expensive technology, this is a standard dc dc converter other than the waterproof aspect.

Specification:

Feature	10A model	20A model
Waterproof	IP68 unit	IP68 unit Fan IP65
Input V	DC 20V-35V	
Stand load on auto	20 ma	20ma
Standby load on ignition feed	0 ma	
Output amps (continuous)	10A	20A
Output power (10 min)	12A	25A
Output power (Max)	15A	35A
Efficiency	90%	
Cooling	Convection	Fan assisted

Protection: Input reverse polarity, output reverse polarity, high temperature trip, overload protection, short circuit protection

Battery to Battery chargers

D/C Input voltage	D/C output voltage		Amps in	Size L x W x D	Weight kg	Part nos
24	12	NEW	20	145 x 110 x 120	3	DCW20
24	12	NEW	10	145 x 110 x 120	3	DCW10

Solar Regulators

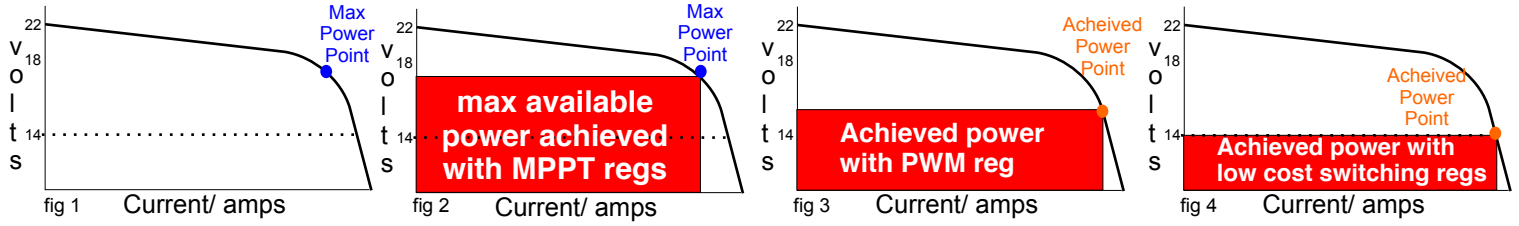
IP68 waterproof

Good Solar cells are very expensive and people who buy and use them want the maximum power they can possibly get from their investment. In order to make an informed decisions as to which type of solar regulator you need then you must understand how a solar cell performs and what is the difference between the 3 main groups of solar regs. As with most things in life, you get what you pay for, a typical 20 A / 12 V solar regulator can vary in price from £20 - 200+, why ? Is the £20 as good as the £160 or at least nearly as good or is it a total waste of money?. Its extremely important to know which technology you purchase.

How does a solar cell work and what are the important operational features? . (please note all Sterling regs are waterproof)

As a solar cell is a current making device at a given voltage, the important thing to remember is the basic formula: ***Power (watts) = amps x volts.*** Therefore, to get the maximum power out of a device you must have as many volts and amps as possible. If the voltage was allowed to reduce, then the performance and hence the power manufactured by the cells drops off, and same for the amps. Maintaining maximum volts and amps is absolutely critical to achieve maximum harvesting potential of a solar cell.

In order to achieve maximum power form a solar sell we must find its **M**aximum **P**ower **P**oint (**MPP**) on the solar cells power curve. This is the ideal point where one can best obtain the most power from that solar cell. **Figure 1** is a typical solar power curve which would have an open circuit voltage of about 22 V but a best power performance voltage at about 17 V. In order to maximise the available power from the solar cell one must maintain the maximum power point and not allow the voltage to drop. The only way to achieve this is to make sure that the solar cells voltage is allowed to float free of the restrictions placed by the battery voltage. I.e. the battery voltage maybe 13.5 V but the maximum power point could be 17 V and, if the solar cell voltage is allowed to be pulled down to the battery voltage (fig 3 below) you can



clearly see that a lot of the positional power which is actually available (fig 2) is in fact not able to be manufactured and as such the achievable power is vastly reduced. **Figure 2** shows the amount of power which can be obtained (in red) which is the maximum volts x amps if the cell was free from the battery restrictions (12V) and allowed to rise up to its ideal operational voltage (17 V). However, if the battery's voltage is allowed to pull down the solar cell voltage, such as the case in low cost PWM (fig 3) or switching regulators (fig 4) they have a direct connection between battery voltage and the solar cell voltage and thus limiting the performance of the solar cell, only achieving 50% (if even) of the potential of the solar cell itself. So, as you can see, to use a low cost regulator on an expensive solar cell can be a waste of money and you will lose 50% of the cell's ability, this is a false economy except is limited applications, it's a bit like buying a Ferrari and putting tractor wheels on it, all the potential of the Ferrari would be neutralised.

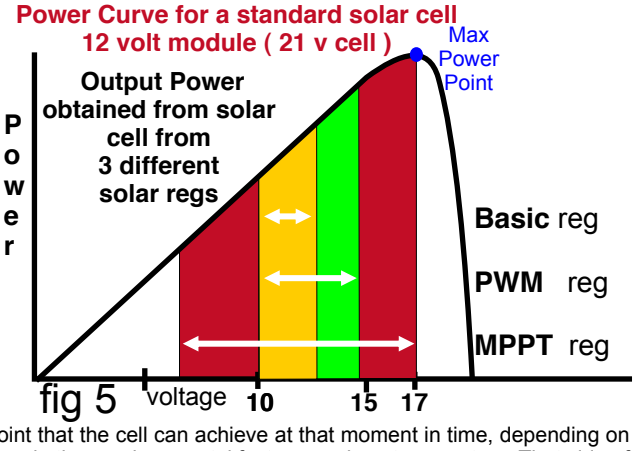
Other key things to think about with solar regs.

Remember a solar cell only works for about ½ a day (if even). However, the solar regulator works for 24 hours regardless of whether the solar cell is producing power or not (night or cloud cover). So, the key question is, **what power does the regulator use to exist (we call this the quiescent current)?** With most solar regulators this averages from 25-50 mA (on a 12V system). That means, for example, a 50 mA drain over 1 years is about 430Ah. However, at Sterling, we try to keep the quiescent current below 1 mA, this means the loss in current over the year would be more in the region of 8A not 430A. Therefore, 422Ah, which would otherwise have been wasted running the regulator can effectively be harvested and passed into the battery system. Low quiescent power consumption is achieved by the use of a more expensive micro processing chip set, some manufactures are reluctant to spend the money on this type of device. Obviously other features which are of vital important are 4 step battery charging and the ability to select the different battery types being charged. This ensures the best charging curves for the battery and also prevents damage to battery bank.

3 main types of solar regulators.

1) **Basic regulators.** These are simple switching devices which switch between 2 voltages, typically they come on at about 12.9 volts at the battery and switch off at about 14 volts (x 2 for 24 V) , this is effective at covering power loss from the battery but will not charge well or effectively use the maximum power potential form the solar cell, which for a lot of applications is absolute fine. Ideal for low cost 10-100 watt low quality solar cells.

The ideal use for this type of reg is, for example, if you had a motor home or a small boat on a swinging mooring and a small solar cell who's only job was to keep the starter battery topped up when vehicle / boat is not in use, then this product is perfect, a low cost cell and low cost switching regulator will do the job. However, if you have a good quality, expensive solar cell, who's job is to effectively and efficiently contribute useful power into a system then this type of regulator would be a very poor choice indeed, as such we limit the range of this product as to use this technology on larger cells simply makes no sense. **Advantage**: very low cost. **Suitable for**: Low cost cells where the objective is simply keeping a relatively inactive battery topped up (such as a starter battery) as opposed to contributing useful power into a system. **Disadvantages**, very ineffective at maximising the harvest from a solar cell. **(Please note the Yellow section on the Power curve graph).**



2) **PWM.** **P**ulse **W**idth **M**odulate regulator (mid range cost, mid range performance) this type of regulator is still connected to the battery bank and is still under the influence of the battery voltage. However, the pulse width modulation allows the cell voltage to rise a bit further but it is still restricted because of its direct connection to the battery bank. Its performance is better than the basic regulator type but still falls short of achieving the maximum available power. The lower the battery voltage (i.e. a battery could drop to 11 volts), where maximum power is required, the less efficient this product is. This can be seen in **figure 5**, whereby as the voltage drops the power does also. Other weakness with PWM controllers is the fact that solar cells open circuit voltage changes with temperature. The colder the cell is, the higher the open circuit temperatures and vice versa, this is important to ensure that the large voltage swings from the solar cell are within the rating of this type of product. This type of regulator is not recommended for use with 'on grid' systems as there is still significant inability to achieve maximum power. They are best used on 'off grid' systems. **Advantage:** Mid range harvest return from the solar cell, works fine especially in good sun conditions, **Disadvantage:** no boost ability so not good in lower light (Northern European use), **Please note on power curve graph, the power harvested would be the Yellow plus the Green section.**

3) **MPPT.** **M**aximum **P**ower **P**oint **T**racking regulators: (latest technology and most expensive type) up to 40% improvement on top of the PWM, which is about 70% on top of the basic unit. These, in effect, disconnect the solar cell from the battery bank to allow it to 'run free of the battery' and obtain its best performance. This means, in effect, you have 2 separate units, the solar cell side, which is allowed to operate free from the battery voltage restrictions, so the software can continually track and determine the most effective maximum power point that the cell can achieve at that moment in time, depending on weather and other environmental factors, such as temperature. That side of the product is 100% geared to maximize the harvesting of the suns energy. This also allows for different cell ratings to be used with different voltages and high temperature swings with no adverse effects and no setup required.

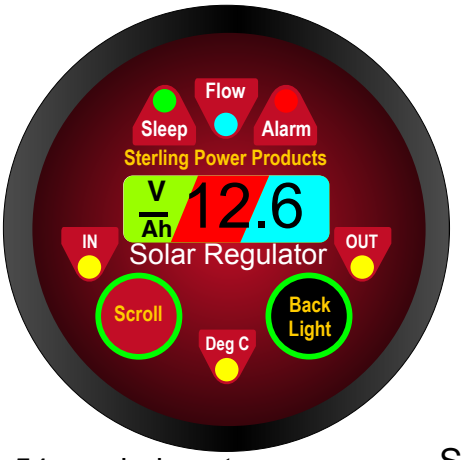
The big advantage of the MPPT is that the battery and the solar cell are not directly connected. This allows the battery charging side of the regulator free to concentrate on the battery / power requirements and effectively use the power available from the solar cell. The power is delivered to it via a highly efficient power conversion process, which not only maintains the max power point (MPP) in the higher voltage levels (when the sun is out) but continues to generate power even under low light conditions when the MPP is below the battery voltage (see fig 4) as the MPPT has a **voltage boost function**. This boost function allows the device to effectively absorb that last little bit of power that can be obtained from the solar cell. Not only is this an effective function on a day to day basis, but, over time, if the cells become damaged, dirty or less efficient the MPPT continues to pull the power when a normal reg will have long since stopped working. Unlike a PWM regulator, an MPPT can be used with 'on' or 'off' grid systems. This system is also easy to install as there is no setup depending on different cell types or environmental temperature, making it totally automatic.

Advantage: Maximum performance from cell, low light / dirty cell operation when all other units have become ineffective. **Absolutely necessary for**: Large solar cells 100 watt + where every bit of possible power is required to be harvested, from 100 watt - 1000 watt **Disadvantages**: higher cost.

Please note on the power curve graph that this technology will harvest between the Red, Yellow and Green sections.

Remote control allows access to all the relevant information, the panel comes complete with a 10 meter telephone type extension lead. The meter is in a standard 450 mm threaded housing. This is an optional product and is not required for the operation of the main products

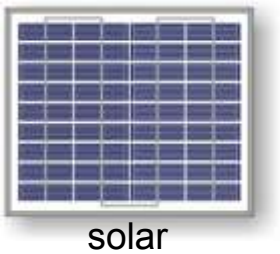
remote control



54 mm hole cut

Solar remote control readings

1) Input voltage from cell
2) Output voltage to battery bank
3) Current generated flowing to battery bank
3) waterproof display, encapsulated electronics
4) 24 Ah manufactured
5) Unit temperature
6) Sleep over ride for information
7) Information scroll option
8) Back light option
9) Little power consumption when on sleep
10) Power manufacturing Flow indicator
11) Battery Temperature



solar

MPPT

150 mm Long x 110 mm Wide 120 High

Small 2amp Switching Regulator

70mm x 70mm x 60mm H

Small 10 amp PWM Regulator

85mm x 85mm x 55mm H

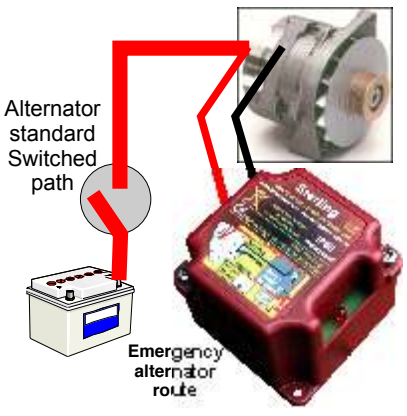
Switcher Reg continuous	Max solar cell Power Watts	Max solar cell open circuit voltage	Quiescent current Draw in ma	4 step Charging	Battery Type selection	Remote Option	Sterling Part Number
12 v 2 amp	70	30 v	0.0 mA	no	no	no	SB122
24 v 1 amp	70	50 v	0.0 mA	no	no	no	SB241
PWM (Pulse width modulated)							
12 v 10 amp	160	30 v	<1mA	no	preset 14 v	no	SPWM1210
MPPT (Maximum Power Point Tracking)							
12 v 60 amp	680	30 v	<1mA	yes	yes	yes	SMPPT1260
12 v 90 amp	1000	30 v	<1mA	yes	yes	yes	SMPPT1290
24 v 30 amp	700	60 v	<1mA	yes	yes	yes	SMPPT2430
24 v 50 amp	1100	60 v	<1mA	yes	yes	yes	SMPPT2450
Remote control option for PWM and MPPT only							SRC

Alternator open circuit protection device IP68

Alternator protection unit

One of the largest destroyer of alternators in the marine world is when a cable comes lose, a fuse blows or an engine is electrically switched 'off' when the engine is running, all these things cause an alternator to be disconnected from the battery while running, this, in turn, causes a massive spike in the alternator which, in turn, can easily destroy the alternator regulator and any other advanced regulators in use, the resulting bills can easily run into the hundreds of pounds, to avoid this, this simple device protects your alternator from that spike offering a simple safe emergency route for that spike to be discharged giving full protection to the alternator's regulator with no back feed up the device. This unit is simple and easy to fit with no intrusion on the standard system. The unit does not carry the main current so only light wiring is required. This unit works in conjunction with any alternator or splitting device suitable for 12 or 24V alternators:

	Size	Weight	Part nos
Alternator protection device(12V)	90 x 90 x 60 H	0.25	APD12
Alternator protection device(24V)	90 x 90 x 60 H	0.25	APD24



1600, 2500 & 3500 Watt

230v 50 hz
auto select 50 or 60 hz

110v 60 hz
auto select 50 or 60 hz

Standard Features:
30 amp through current
P.F.C. (power factor correction)
Inc remote control with
10 metre cable
4 step progressive charging
8 battery type selector
Earth - Neutral link when on inverter mode to comply with latest regulations

Now fitted with
new TX transformer
50% less quiescent current

EN61000-3-2
EN61000-3-3
EN50081-1
EN60335-2-29

Awarded Winner *Best Buy* from SAILING TODAY 2008 In combi test against Victron Mastervolt & Studer

Remote control included.

The new Pro Combi range is designed to be very competitive, no frills, high performance, and value for money products, presented in a simple, easy to install and use style.

If you require power assist, parallel connection, three phase output functions or any other enhanced combi features then this range is not for you. If you're not familiar with these things this ProCombi is perfect for you.

Modern combis are getting more and more complex, with each company trying to out do the next with abilities beyond the understanding and requirements of most people. This detracts from the combi's main strength of being easy to install and easy to use. There is, no doubt, a market for all the sexy functions but the vast majority of combi users simply do not need them and never will. Most people simply require the unit to act as a high performance constant current battery charger when on mains power then cross over to act as an efficient inverter when on battery - and that's it!

The problem with enhanced functions is, even if they are not used, they eat up valuable power. The more functions on a product running (even though you do not use them) the higher the quiescent current on the inverter (the current the unit uses itself to operate). Complex combis at 12V can use as much as 9.5 A, whereas, Pro Combi can use as little as 2A.

Also, a lot of the expensive combis do not even have a power save function which can drop the combi power consumption to as little as 0.2A when off load, some combis continue to consume 2A + even when there is no load.

Sterling has reversed this trend with this Pro Combi range by stripping away the unnecessary features from a complex combi saving money. The end result is a simple, straight forward product that does what you think it should. Using our years of experience in this market we have tailored the product range to suit 90% of people purchasing Combis.

How to compare model ratings with other Combis:

Watts vs VA: the truth

The most significant issue to be aware of is how output ratings are massaged to appear better than the competition. You might be excused for thinking that a unit with '3000' written on it, for example, means that it will deliver 3000W continuously. This is not necessarily the case if you look at the small print.

Have you ever found it strange that the product you want to run (i.e. the hair dryer, washing machine, TV, etc.) has the power consumption shown in watts, yet the inverter/ generator companies give you the rating in VA, and when you put your 1000W product on a 1000 VA inverter it does not work. In the small print you find out that the 1000 VA inverter is only 700 watts for 10 mins then it over heats- this simply cannot be right.

In the eyes of the unknowing consumer, rating a power product in VA is a simple way of using meaningless figures to confuse and make performance appear better than it really is. Unfortunately this practice is still allowed in Europe (European standards committees are looking into this practice) unlike the USA where there are recognised standards (eg ABYC) and you can be sued for publishing misleading information and incorrect ratings. The only true rating, without confusion, is in watts, using a simple resistive load with unity power factor, such as an electric heater / standard light bulb, etc. This method gives a lower correct figure, however, it is not what the marketing teams involved in promoting power products want to see.

Take, for example, a 3000 Victron Multi that is perceived by the public to be 3000W continuously rated. If, however, you read the Victron specification for watts at 40degC the actual power is 2200Watts.The Sterling 2500W Combi delivers 2300Watts which in fact makes it a more powerful unit . This distortion is not limited to Victron, unfortunately most, if not all, the European manufacturers push model figures to the realms of fantasy in spiralling competitiveness and in order to confuse and impress the public who believe that these figures are actual continuous power rating.

Furthermore, the effects of temperature and the duration of duty (i.e. how long a load is maintained) can also be used to manipulate ratings. It is much harder for a unit working in 40degC ambient temperature than in 25degC, just as it is harder to run at a higher load for extended periods. Therefore, a unit rated for short periods at a cooler temperature will also appear more powerful.

To illustrate, taking data published by Victron Energy and Mastervolt, the following comparison can be made:

Model/product	Public perceived power	True Cont. Watts @ 40degC
Victron Phoenix MultiPlus 12/3000/120	3000W	2200Watts
Mastervolt Mass Combi 12/2500-100	2500W	Not stated
Sterling Pro CombiS or Q 12/2500	2500W	2300Watts
Victron Quattro 12/5000/200	5000W	12 V / 3000Watts
Sterling 3500 combi	3500W	3300Watts

The simple truth of the matter is VA means nothing. If you want to know how much power your inverter is going to give you then ask for the rating in watts at 40 deg C , all the other ratings should be kept for the comic books where they belong. ProCombi has the lower value in the model name but, in fact, is the more powerful of the bunch when like for like ratings are compared making it even better value for money than you thought. With the Sterling unit you get what you think you should be getting, and it does what it says it does on the box.
The sooner ratings have a legal recognised standard like the U.S.A. the better for everyone.

Pro Combi Q quasi sine wave 220 v 50 Hz Euro Standard

D/C voltage	Power at 25 deg C (watts)	Part nos
12	1600	PCQ121600
12	2500	PCQ122500
24	1600	PCQ241600
24	2500	PCQ242500

Pro Combi S pure sine wave 220 v 50 Hz Euro Standard

D/C voltage	Power at 25 deg C (watts)	Part nos
12	1500	PCS121500
12	2500	PCS122500
12	3500	PCS123500
24	1500	PCS241500
24	2500	PCS242500
24	3500	PCS243500

European use

230 V 50 Hz

Pro Combi Q quasi sine wave 110 v 60 Hz USA Standard

D/C voltage	Power at 25 deg C (watts)	Part nos
12	1600	UPCQ121600
12	2500	UPCQ122500
24	1600	UPCQ241600
24	2500	UPCQ242500

Pro Combi S pure sine wave 110 v 60 Hz Euro Standard

D/C voltage	Power at 25 deg C (watts)	Part nos
12	1500	UPCS121500
12	2500	UPCS122500
12	3500	UPCS123500
24	1500	UPCS241500
24	2500	UPCS242500
24	3500	UPCS243500

North America

110 V 60 Hz

What does the Pro Combi range offer?

On the battery charger side

1) 4 step constant current battery charging
2) 8 preset battery type selector plus de-sulphation
3) powerful charge rate
4) will charge even with totally flat batteries
5) PFC, draws about 30% less power than conventional units

On the crossover side

1) 20 m/s crossover time, will not to lose any equipment due to power loss
2) 30A through current ability on all models
3) twin 30A / single 50A on the 3500W models

On the inverter side

1) high overload ability
2) high temperature rating
3) low quiescent current
5) power saver mode to automatically reduce power
6) allows through power even with no batteries connected
7) neutral earth link to enable RCD breakers to work

On the remote control

1) ability to switch the unit on/off
2) ability to select or de select power saver mode

General

1) removable local panel to give remote control with warning and function LED
2) remote on/off plus remote power saver on/off
4)10 metres remote cable
5) almost 20 alarms / warnings / information

There are 2 main models the **Pro Combi Q** (for **quasi-sine wave**) and the **Pro Combi S** (for **pure-sine wave**)

So the simple question is, what best suits your needs?

Pro Combi Q, (quasi-sine model) suitable for most installations, where you would use a microwave, fridge, hair dryer, vacuum cleaner, kettle, computer, etc The vast majority of products will run on quasi-sinewave. Hi Fi could have a buzz on the speakers and older non flat screen TVs may have a line on the screen. It is not possible for us to say what item may have a problem, if any.

Pro Combi S (pure sine wave model) where all the above plus washing machines, bread makers, thyristor controlled equipment are used - then sine wave is required.

To make the choice even simpler we have 6 months exchange/upgrade policy. If you purchase a Pro Combi Q and find there is some equipment that you cannot run due to the Quasi Sine wave and require Pure Sine wave, Sterling are happy to up-grade your quasi-sine unit for Sine wave with the only cost being the difference between the 2 products (unit must be sent direct to Sterling and in good condition). Offer applies dealing direct to the factory only.

General specification	Pro Combi Q	Pro Combi S
Input Wave form:	Pure sine wave	Pure sine wave
Nominal Voltage:	Input 230 v a/c 110v USA	Input 230 v a/c 110v a/c USA
Low voltage trip:	184v+/- 4% Euro 92v USA	184v+/- 4% 92v a/c USA
Minimum engage:	voltage 194v +/- 4% 97v USA	voltage 194v +/- 4% 95v USA
High voltage trip:	270v +/- 4% 128v USA	253v +/- 4% 126v USA
High voltage re engage:	253v +/- 4% 122v USA	243v +/- 4% 121v USA
Max input a/c voltage:	270 v rms 135v USA	270 v rms 135v USA
Nominal input frequency:	50hz or 60hz auto detect	50hz or 60hz auto detect
Low freq trip:	47 hz for 50 hz, 58 hz for 60 hz	47 hz for 50 hz, 58 hz for 60 hz
High freq trip:	53 hz for 50 hz, 62 hz for 60 hz	53 hz for 50 hz, 62 hz for 60 hz
Output wave form:	(on by pass mode) same as input	(on by pass mode) same as input
Overload protection :	Circuit breaker	Circuit breaker
Short circuit protection :	Circuit breaker	Circuit breaker
Transfer switch rating :	30 amp	1500-2500 w = 30 amp the 3500 w= 50 amp
Efficiency on line transfer mode:	96%+	95%+
Line transfer time :	20 ms	20 ms
Bypass without battery connected :	yes	yes
Max by pass current :	30 amps	30 amp
By pass over load current :	35 amps: Alarm	35 amps: Alarm
Inverter Specification / output		**Inverter Specification / output**
Output wave form:	Modified Sine Wave/ Quasi sine wave	Pure sine wave
Output continuos power watts	1600 2500	continuous 1500 / 2500 / 3500
Output continuos power VA	2400 3600	
Power factor:	0.9- 1.0	0.9-1.0
Nominal output voltage rms :	230vac 110v USA	230vac 115v USA
Max voltage rms :	260vac 110v USA	260vac 130v USA
Output voltage regulation:	+/- 10% rms	+/- 10% rms
Output frequency:	50hz+/-0.3hz or 60hz+/-0.3hz	50hz+/-0.3hz or 60hz+/-0.3hz
Transient response time:	<150ms;0% to 100% RCD load	<150ms;0% to 100% RCD load
Nominal efficiency :	>85%	>88%
Surge ratings :	1500model =4500va 2500model = 7200va	PQS1500=4500va PQS2500=7200va
Online current consumption at 12 v/24	12 v 2a 24v 1 amp with new TX tran	12 v 1.4amps 24v on 1500-2500 sine , 4.5 amps for 3500 unit
Power saver mode current consumption	12 v 0.4 24v 0.2	12 v 0.4 24v 0.2
Short circuit protection:	yes, less than 3 cycles	yes, less than 3 cycles
Inverter Specification / input		**Inverter Specification / input**
Nominal input voltage :	12 or 24 v depending on model	12 or 24 v depending on model
Minimum start voltage :	10 v for 12 v model 20v for 24 v	10 v for 12 v model 20v for 24 v
Low battery alarm:	10.5v for 12 v model 21v for 24 v	10.5v for 12 v model 21v for 24 v
Low battery trip:	10 v for 12 v model 20v for 24 v	10 v for 12 v model 20v for 24 v
High voltage alarm:	15.5 for 12v model 30v for 24 v	15.5 for 12v model 30v for 24 v
Power saver :	below 20 watts when enabled	below 20 watts when enabled
Power saver :	can be switched on/off on remote control	Same switched on/off on remote
Charger Mode specification		**Charger Mode specification**
Input voltage range:	196-245 v ac 96-130 v ac USA	196-245 v ac
Output voltage:	dependent on battery type selection	dependent on battery type
Output current 12 v model :	1600- 40A 2500 - 55A	1500 - 40A 2500 - 70A 3500 - 100A
Output current 24 v model :	1600- 20A 2500 - 25A	1500 - 20A 2500 - 35A 3500 - 50A
Battery initial voltage for start up:	0-15v for 12 v x 2 /24v	0-15v for 12 v x 2 /24v
Over charge protection shutdown:	15.7 12 v x 2 for 24 v	15.7 12 v x 2 for 24 v
Charger curves (4 stage constant current)Battery types		**Charger curves**
4 step digital controlled progressive charge		**Same as Pro Combi Q**
Battery type charge V float V x 2 for 24 V		**same**
Gel U.S.A 14.0 13.7		same
A.G.M. 1 14.1 13.4		same
A.G.M. 2 14.6 13.7		same
Sealed Lead Acid 14.4 13.6		same
Gel Euro 14.4 13.8		same
Open Lead acid 14.8 13.3		same
Calcium 15.1 13.6		same
De-sulphation 15.5 for 4 hrs		same
Battery bank size: auto detected / auto program adjusted		same
General Features.		**General Features.**
Remote control. Front control panel removable as remote		Front control panel removable as remote
Size: in mm 185W 180H 430L (1600, 2500)		Size: 185W 180H 430L (1600, 2500) 227W 180H 512L (3500)
Weight: 1600w 18 kg 2500w 20 kg		Weight: 1500w 20 kg 2500w 20 kg 3500w 24kg

Quasi Sine Inverters

Pro Power Q

General opinion over the last few years was that the quasi-sine wave inverter was dead and the pure sine-wave inverter would rule the world (an opinion not shared by Sterling). Sales of quasi-sine wave inverters have continued to out-grow sales of pure sine-wave, proving that there is plenty of life left in this technology. The principle reason is that most of the equipment such as mobile phones, TVs, drill chargers and all that type of equipment which used to have a problem working with quasi-sine wave tends to now work fine on quasi-sine as the effected equipment tends to use a switch mode power supplies in the design which works fine with quasi sine wave. This meant that rather than the problems getting worse over the years the problems have diminished, however, this is not to say that the odd microwave, drill, vacuum cleaner would not work (if there is a thyristor control circuit employed then this can still be an issue) but there is no question this is becoming more rare as the years go past, plus, it usually is a lot cheaper to replace a £35 microwave to a different model which will work rather than spend £700 on a sine wave model to make it work .

Sterling has invested in a new range of quasi-sine inverters because they are smaller, lower cost, offer better performance, are more efficient and more reliable than sine-wave. We, at Sterling, have always found the quasi-sine wave inverter more than adequate for general requirements in boats and vehicles. There is still the odd appliance, such as washing machines, where quasi-sine wave inverters simply do not work but all in all they do a great job - especially considering their cost. With this in mind, we have made a new range of DIGITAL quasi-sine inverters called the Pro Power Q. The idea behind this was to push forward this technology and bring in some new features. The most obvious change in this new inverter is its style, tough aluminum extrusion with great looking plastic end caps. Euro and British sockets are on all this range, enabling the unit to be compatible across Europe without problem. The new extrusion design has allowed us to reduce the size of the 1000-2500W units by nearly 40% but still offer their full power and even better performance over the previous models. If you also require a battery charger then look at our new Pro Combi Q range.
Noisy fans was always a favorite complaint with our standard range, So for power to size ration this new larger size Pro Power Q range is simply unchallenged.

ALL THESE INVERTERS ARE e marked to 95/54/EC

I12150

350 WATT

800 watt

I12150CT

1800 watt

1000-2700 watt inc remote control and 10 mtrs cable

2700 watt

150W oval style is available in 2 versions
I12150 = this model is the most popular with a universal socket which can be used for all different plugs round the world.
I12150CT = this model has a British socket on one side and a German style socket on the other, This unit tends to be used where companies want to have the inverter standard rated as a mains power source, where in actual fact it is an isolated power supply.

New turbo coke can inverter:
The popular 100 watt inverter which can lie flat or fits in a standard coke can holder in cars / lorries / boats now has a new big brother which keeps the same convenient style and application, but now has an internal fan to keep it cool. The end result is that it can produce a comfortable 170 watts. The new turbo model is about 20 mm longer and requires either an open cup holder or a cup holder with at least 5 mm larger diameter than the unit to allow the fan enough room to let the air flow through the product.

I12100

I12170T

Fan cooled 200 watt

The quasi sine wave inverter is by far the most popular for the above reasons. All Sterling inverters are continuously rated, with all the usual overload, over voltage and low voltage cut outs, all the inverters come with cable and 24 kt gold connectors, in order to prevent battery terminal corrosion. Available in 230 volts for UK and Europe and also 110 volt for building sites / off vehicle use or for equipment supplied on boats made in the USA (not suitable for washing machine / some bread makers)

230 v 50 hz Quasi Sine wave inverters

Socket type	Voltage d/c	Power(continuous)	Size L x W x Dmm	Weight	Part nos
Universal	12	100 watts	65 dia 145	0.2	I12100
Universal	12	150 watts	100 mm oval 145L	0.3	I12150
British/Euro	12	150 watts	100 mm oval 145L	0.3	I12150CT
Universal	12	200 watts	65 dia 145	0.3	I12170T
British/Euro	12	350 watts	120 x 150 x 65	1.0	I12350
British/Euro	12	600 watts	150 x 150 x 65	1.3	I12600
British/Euro	12	800 watts	180 x 150 x 65	1.8	I12800
1000-2700 watt Inc Remote control and 10 metres of cable					
British/Euro	12	1000watts	180 x 250 x 100	2.0	I121000
British/Euro	12	1800watts	270 x 250 x 100	4.0	I121800
British/Euro	12	2700watts	370 x 250 x 100	5.0	I122700
5000 watt inc remote control , not compact design as above					
British/Euro	12	5000watts	700 x 250 x 250	10.0	I125000
New High power versions no remote					
Hard wired	12	4000watts	510 x 230 x 155	7.0	IH124000
Hard wired	12	5000watts	510 x 230 x 155	7.5	IH125000
24 v versions					
Universal	24	100 watts	65 dia 145	0.3	I24100
Universal	24	150 watts	100 mm oval 145	0.3	I24150
British/Euro	24	150 watts	100 mm oval 145	0.3	I24150CT
Universal	24	200 watts	65 dia 145	0.3	I24170T
British/Euro	24	350 watts	120 x 150 x 65	1.0	I24350
British/Euro	24	600 watts	150 x 150 x 65	1.3	I24600
British/Euro	24	800 watts	180 x 150 x 65	1.8	I24800
1000-2700 watt Inc Remote control and 10 metres of cable					
British/Euro	24	1000watts	180 x 250 x 100	2.0	I241000
British/Euro	24	1800watts	270 x 250 x 100	4.0	I241800
British/Euro	24	2700watts	370 x 250 x 100	5.0	I242700
5000 watt inc remote control , not compact design as above					
British/Euro	24	5000watts	700 x 250 x 250	10.0	I245000
New High power versions no remote					
Hard wired	24	4000watts	510 x 230 x 155	7.0	IH244000
Hard wired	24	5000watts	510 x 230 x 155	7.5	IH245000
110 v models for UK building sites with remote control and Engine interlock					
Yellow 16 amp	12	1800watts	270 x 250 x 100	2.0	AI121800
Yellow 16 amp	12	2700watts	370 x 250 x 100	4.0	AI122700
Yellow 16 amp	24	1800watts	270 x 250 x 100	2.0	AI241800
Yellow 16 amp	24	2700watts	370 x 250 x 100	4.0	AI242700

Pure Sine wave inverters with USB and RCD version

Range 300-1600 watt 12 & 24v

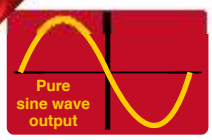
Pro **Power SB (R)**

Option 1
Twin socket
adjustable between
Centre tapped earth
and Neutral earth bonding
with USB charger
Optional remote control

CE RoHS compliant

Option 2
Pre-wired
RCD
Centre tapped earth &
Neutral earth bonded
with USB charger
Optional remote control

Optional remote
with 10 metres cable



Pure Sine Wave Inverters

- With Twin socket or built in **RCD**
- adjustable between **Neutral Earth Bonding** and **Centre Tapping**

Rating Continuous

Model	Centre tapped Earth	Neutral earth bonded	Remote	Weight	Size mm	Cables	Part number
12V 300 watt Twin sockets	Interchangeable	between both	Optional extra	1.4 kg	190x85x210L	1m DC 8 mm ring	SIB12300
12V 600 watt Twin sockets	Interchangeable	between both	Optional extra	2.2 kg	190x85x250L	1m DC 8 mm ring	SIB12600
12V 1000 watt Twin sockets	Interchangeable	between both	Optional extra	2.0 kg	190x85x300L	1m DC 8 mm ring	SIB121000
12V 1600 watt Twin sockets	Interchangeable	between both	Optional extra	3.6 kg	190x85x300L	8 mm connection	SIB121600
24V 300 watt Twin sockets	interchangeable between both		Optional extra	1.4 kg	190x85x210L	1m DC 8 mm ring	SIB24300
24V 600 watt Twin sockets	interchangeable between both		Optional extra	2.2 kg	190x85x250L	1m DC 8 mm ring	SIB24600
24V 1000 watt Twin sockets	interchangeable between both		Optional extra	2.0 kg	190x85x300L	1m DC 8 mm ring	SIB241000
24V 1600 watt Twin sockets	interchangeable between both		Optional extra	3.6 kg	190x85x300L	8 mm connection	SIB241600
12V 1000 watt with RCD	**Pre-fitted and wired RCD option with 1 meter AC cable**	Neutral earth bonded	Optional extra	2.0 kg	190x85x300L	1m DC 8 mm ring	SIBR121000
12V 1600 watt with RCD		Neutral earth bonded	Optional extra	3.6 kg	190x85x300L	8 mm connection	SIBR121600
24V 1000 watt with RCD		Neutral earth bonded	Optional extra	2.0 kg	190x85x300L	1m DC 8 mm ring	SIBR241000
24V 1600 watt with RCD		Neutral earth bonded	Optional extra	3.6 kg	190x85x300L	8 mm connection	SIBR241600
Remote control (**fits all the above models**)					90x60x20	10 meter	SWR

ONBOARD ENTERTAINMENT EQUIPMENT INVERTER

400 watt, Pure sine wave (low frequency)

With auto cross over switch (U.P.S. FUNCTION)

Dedicated for use with AV systems these models have particularly low levels of noise emissions to which very sensitive equipment can be susceptible. The auto crossover function means that when power is transferred from inverter to another available source, there is no loss of power to the appliances. As a result there is no interruption to operation and clock settings etc are preserved.

Output continuous power 400 watts
Surge rating (5 seconds) 800 watt
Output voltage 230 volts +/- 3 volts
Efficiency 88%
Power draw in stand buy 0 amps

includes
d/c input cables
a/c input cables
plus
remote and 10 meters cable

230 v 50 hz Pure Sine wave (telecom standard wave form)					
Socket type	Voltage d/c	Power(continuous)	Size L x W x D mm	Weight	Part nos
Universal	12	400 watts	280 x 165 x 100	5.5	SI12400
Universal	24	400 watts	280 x 165 x 100	5.5	SI24400

Power Management Panel 4 X AMPS , 4 X VOLTS, AND 1 X Amp Hr Counter

The latest software driven Power Management Panel is an extremely effective unit designed to monitor and display all the vital electrical information on an average boat. This enables important (potentially expensive) decisions to be made regarding faults and general on-board D/C electrical power management. The information obtained also helps any third party engineer to identify problems.

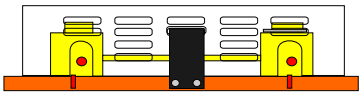
The operation of the panel is based on 100 mV shunts. Shunts enable all current measurement to take place remotely from the instrument clusters, thus removing all the voltage drop and R.F.I. problems associated with running heavy duty cables up to a control panel and navigation instruments.

The new panel has a built in Ah counter on one channel, and in total enables 4 different amp readings, 4 different volt readings, and one Ah counter. **The shunts of the system can be fitted in negative or positive cables (unlike most others).** The counter counts the amps going into and out of the battery system. The amp hour counter setup and function are completely automatic and requires no intervention from the user.
The background light ensures perfect legibility in daylight, direct sunlight and at night.

Each panel comes complete with a 200A shunt, (up to 3 extra shunts may be purchased) and a list of labels for the panel front.
The plastic box can either be surface or flush mounted by using the new parts.

Power Consumption = 0.5 mA off/0.7 mA on
Max readable current = 199 A D/C
Max display volts = 199 V D/C
Safe to over 1000 amp surges
L.E.D. Background light.
amp hr ctr up to 7999 amps
Screen = 16 digit 2 line L.C.D.
Back light/switched
Accuracy = + or - 1%

Extra Shunts
available, 200 + 400A

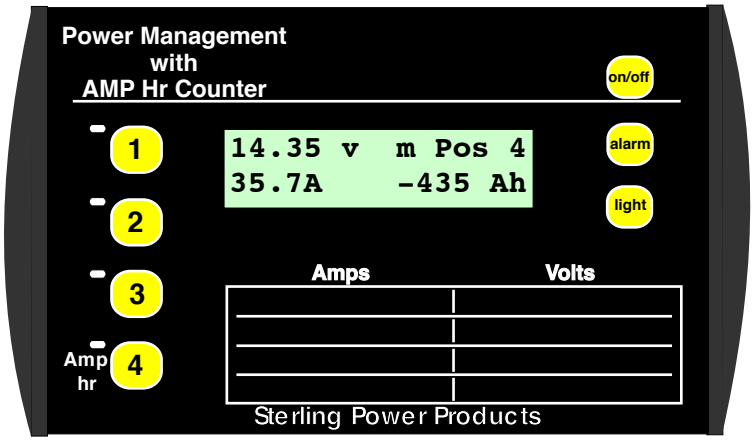


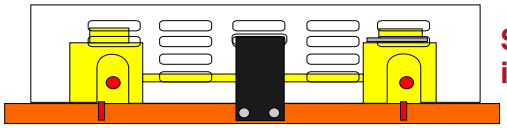
200A shunt = 200Lx40Wx50H
400A shunt = 260Lx55Wx50H

Power Management Panel with Ampere Hour Counter
(Includes 1x 200A brass shunt)

Power Management Panel			
D/C voltage	Size L x W x D mm	Weight kg	Part nos
12 & 24	170 x 90 x 40	0.25	PMP1
Extra 200 amp shunt			S200A
Extra 400 amp shunt			S400A

A 200A shunt is suitable for inverters up to about 2000W at 12V / 4000W at 24V
the 400A shunt is suitable for inverters up to about 4000W at 12V. The shunts have
a very high instant load ability, i.e. 1000A to start an engine etc. is no problem on either size.

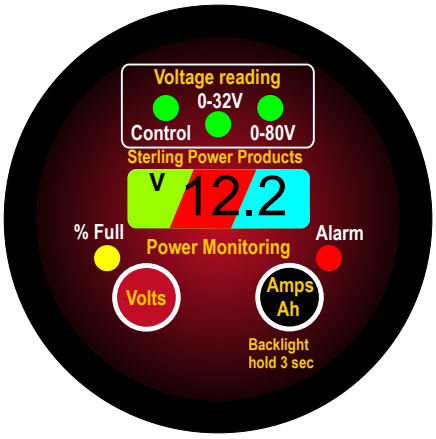




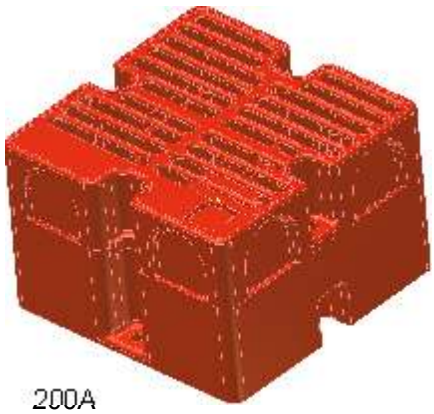
Shunt included

200A shunt

1 X Ah counter, 1 x ammeter 3 x voltmeters IP68



54 mm hole cut
68 mm outer frame diameter
Panel depth 0-30 mm



200A
85 mm x 85 mm x 67 mm high
weight 0.25 kg

Key Functions over competitors:
This new design makes full use of the intelligent shunt concept where all the measurements takes place at the shunt and the data is then transmitted.
By use of intelligent shunts, this unit can be used on Negative or Positive cables making the unit extremely flexible. Both the shunt and the remote are epoxy encased for water protection and anti vibration. The LED is multicoloured allowing different colours to be displayed to show different activity on the channel.

Functions:
1) 3 x Voltmeters, supply voltage + 2 others, individual alarms (adjustable), accuracy from 0.01V
2) Ammeter 0.01 - 500A (depending on shunt) (200A continuous)
3) Ampere hour counter up to 999 Ah, (adjustable alarm)
4) Suitable for up to 2000Ah battery bank (1200Ah for lithium)
5) Power consumption on sleep (unit still counting)= < 1mA (0.001A)
6) Power consumption active (screen working no back ground light) = < 2mA
7) Power consumption with background light = 10mA
8) Back ground light changes colour depending on activity.
Green (within parameters) Blue (charging)
Red (low battery requiring attention)
9) Adjustable buzzer alarm, can be deactivated
10) Comes preset to use with no adjustments
12) Fully adjustable, alarms and warnings
13) Readings can be locked or allowed to scroll
14) Background light switchable, plus changes colour depending on operational events ie red for danger green for ok Blue for charging etc
15) 12/24V unit auto

Intelligent shunt: Rather than putting the brains of the operation in the remote multimeters the intelligent shunt process all the information at the shunt. This ensure accurate digital streaming up to the remote control ensuring no corruption of the data; this also reduces the size of the remote control.

Specification:
12-24V base voltage
Quiescent current:
with no display active (sleep mode) 0.001A
with display active and background light 0.008
Voltmeters 0-36V
ammeter 0-500A
ammeter accuracy between:
0-1A / 0.01A resolution
10-100A 1A
100-500 10A
Ah capacity 999Ah, suitable for up to 2000Ah battery bank
Ah accuracy +/- 2%

Product	Continuous current	Overload ability	Part Nos
Panel Meter (no shunt)			PM1
200A shunt	200A	100A	PMS200
Panel meter with 100A shunt			PM200

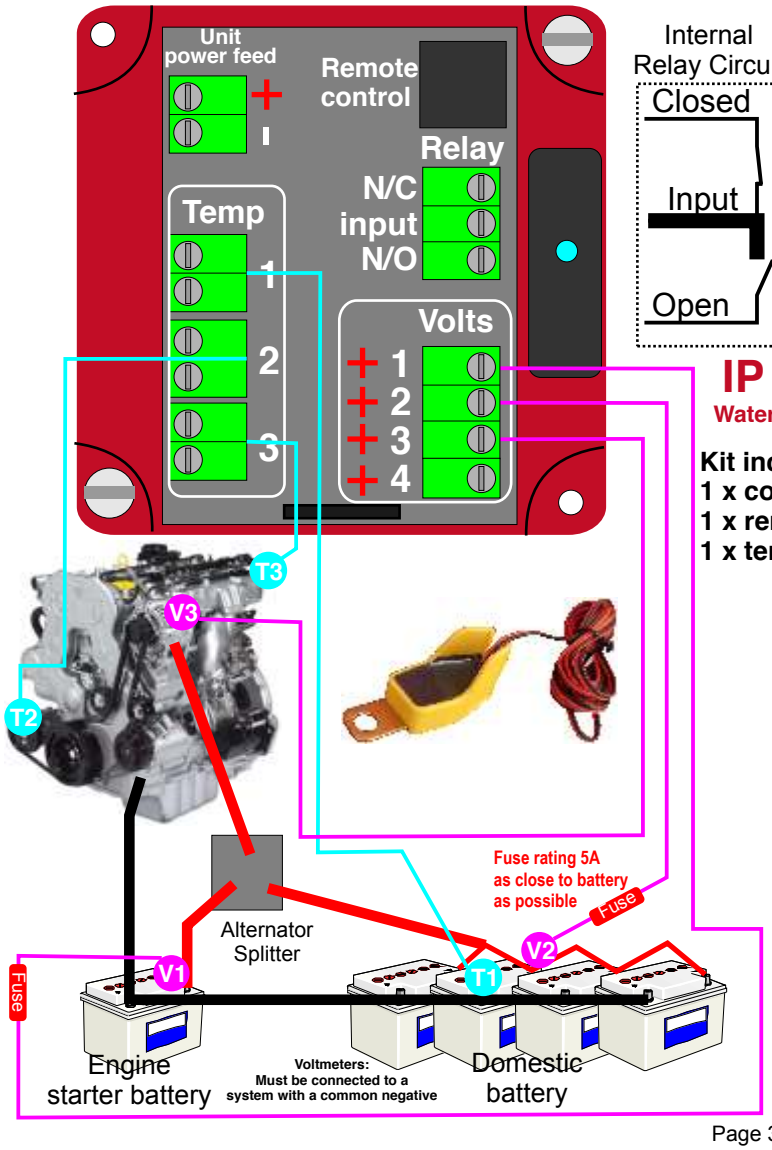
Voltage, Temperature & monitoring with alarm

IP 68
Waterproof

Standard instrumentation never seems to give you what you want. This product comprises of a device capable of measuring 4 voltages and 3 temperatures. Not only can the unit monitor, it can also have each channel alarm at specific levels - high and low voltage alarms (made by you), for example, you may want a low voltage alarm at 10.5V with a high voltage alarm at 15V. This may be the same with temperatures, you may want to measure battery temperatures and set the alarm off at 50 deg C, 70 deg C for an engine water pump case or even the overboard exhaust temperature to ensure the sea water cooling pump is operational. The product is totally flexible and allows you to choose what you wish to monitor and what alarm parameters you wish the unit to activate at.

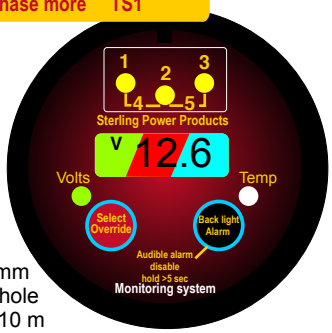
Specification:
Supply voltage: 8 - 35VDC
Current consumption: < 3mA (30mA with backlight), < 1mA Sleep mode
Voltage monitoring range 1 x 0 - 5VDC (galvanic montering circuit) , 1 x 0 - 33VDC (unit supply voltage) 3 x 0 - 60VDC
Adjustable conversion factor for each voltage channel individually
Low and high voltage alarms for each voltage channel in the full range
Temperature range: 3x -10 - 150 DEG C
Temperature can be displayed in Celcius or Fahrenheit
High Temperature alarms for each temperature channel in the full range
Relay (open or closed) can be linked to any volt or temp channel.
Backlight colour user selectable (blue, red or green) or Auto select, changes colour based on alarms or conditions
Screen alarms: for any alarms the screen will display a red screen
Buzzer alarms: for any alarms the buzzer can be **on** or **off**. If **on** the alarm can be muted.

Manual lock or auto scan. The unit will, on default, simply scan through all 5 voltage and 3 temperatures remaining on each parameter for about 3 seconds, you have the option to allow continuous scan or simply lock the display on the one screen. Please note that even if you have locked the display on one parameter all the other parameters are still being scanned and, if there is an alarm on one of the other channels while you have it locked onto a different channel the alarm will breakthrough. After you acknowledge the alarm the previously locked screen will be returned automatically.
Setting degree C or degree F scale. The default is set at deg C, however, the deg F scale can be simply selected during setup. Prior to auto scanning the 3 temp readings the unit will display C or F to show the scale it is locked onto. Obviously if this information is redundant after setup but remains incase a person not knowledgeable about the equipment if looking at the screen.
Removing unwanted channels. There are, in total, 8 channels yet you may only want 3 or 4. You can simply remove the channels from the scan list if not required.
Removing unwanted alarms. There is an upper (volts + temps) and lower alarm (volts) for each setting. You may not wish to engage some of these alarms, you can simply remove any alarms you wish not to use.
Relay Circuit. The relay circuit can be attributed to any one specific setting of the 8 channels or switch when any of them alarm. To do things like start a generator up when the batteries get too flat or shut an engine down if a temperature gets too hot. There is a relay offering normally closed (N/C) or normally opened (N/O) switching. This can then be used to activate whatever you wish to upon the alarm levels being reached. In most cases we think this will be to start up a generator to charge the batteries so the default setting is on channel 1 set at a low voltage warning. This will activate the relay thus activate the gen set if you have that ability on your gen set. However, any other of the parameters can be used. I.e. you may want high temperatures to switch off an engine in which case simply program one of the high temp trips to do this.
Background LED lights will only stay on in auto mode when the system has surplus power i.e. it's charging.
Special Gen start ability, it's easy, based on low battery voltage, to start a gen set to charge your batteries. However, knowing when to stop it is a lot harder, the software gives some special features, upon starting the gen set (or other device), one can stop it based on voltage (or temp if it's fans etc you need to start) with the added bonus of adding a time delay to the off setting. I.e. you may wish to switch off the gen set 2 hrs after reaching the desired voltage, also for safety there is a **safety timeout setting,** i.e. if the gen set is activated but the battery charger is defective the unit could keep the gen set running until the diesel runs out, however, we have a time out setting which allows the gen set to run for a max of "for example" 12 hours (adjustable) and, if the batteries or whatever operation was not achieved in that time frame then the unit will switch the gen set off and it will stay off (all settings are optional and fully adjustable in the software) .
Lock unit. if you run a charter boat you do not want your customers to change the settings. In this case you can lock the settings by a code. In the case you have locked the unit it will only be possible to screen through the displays and to mute an alarm.
Automatic backlight color change. The backlight can change its colour automatically if the colour change value has been tripped. I.e. In a 12V system: < 12.2V = red colour, < 13.2V = green colour, < 15V = blue color, > 15V = red colour. These values can be changed for each channel individually.
Low voltage saving. The lowest voltage for each channel will be saved. The voltage has to remain at this level for minimum 10 minutes to be saved. This ensures that there will be no low voltage saved in case an anchor windlass or bowthruster has been used. This value can be deleted to run a new low volt monitoring.



4 x voltmeters
3 x thermometers (1 sensors included 2 meters cable)
Adjustable alarm settings
Relay (latching) switch to activate any auto start equipment.

input V d/c	Size L x W x H mm	Weight kg	Part nos
12-24	70 x 70 x 60	0.2	TVM1
Extra temp sensors (1 included) purchase more			TS1



IP 68
Waterproof

54 mm cut hole inc 10 m connection cable

Kit includes:
1 x control box
1 x remote control
1 x temp sensor

Typical installation: Totally flexible for example only
Remember it's up to you what you want to measure, based on the limitations of the product, this is a simple installation to show the flexibility of the products and is not a "must connect this way" system, also, note you can program out alarms which you may not want and you do not need to use all channels

Typical extra voltages you may wish to be monitored

V1 = Engine battery voltage (confirm engine is ok)
V2 = Domestic battery / Bow thruster / Aux Generator/ Winch etc
V3 = Alternator voltage (confirm alternator is ok)
V4 =
V5 = Unit actual internal operational control voltage

Typical extra Temperatures which you may wish to be monitored

T1 = Domestic battery bank (to ensure batteries not overheating)
T2 = Sea water pump case, (to ensure strainer not blocked or impeller blades damaged) or stern tube etc
T3 = Overboard exhaust temp (to ensure good coolant water flow through exhaust outlet, quickest way to spot serious/expensive engine problems)

High Power Distribution and Fuse Box

Up to 500 amps

This product is designed to ensure your D/C electrical distribution system on boats and specialist vehicles is both very safe and compact. The clear plastic cover makes it easy to see the green LEDs indicating live circuits and the red LEDs indicating failed circuits. In the event of concerns about excess power being used by the LEDs a simple link can be removed to kill all the green LEDs (that would otherwise be on all the time) but leave the red (fuse blown warning) LEDs active (but only on in a fault condition).

Other interesting features include an alternator fail safe blow fuse. The alternator fuse can safely blow but offer the alternator an emergency link to prevent the alternator's regulator from being damaged due to the loss of a battery link. This output can also be used for other purposes if not being used for an alternator.

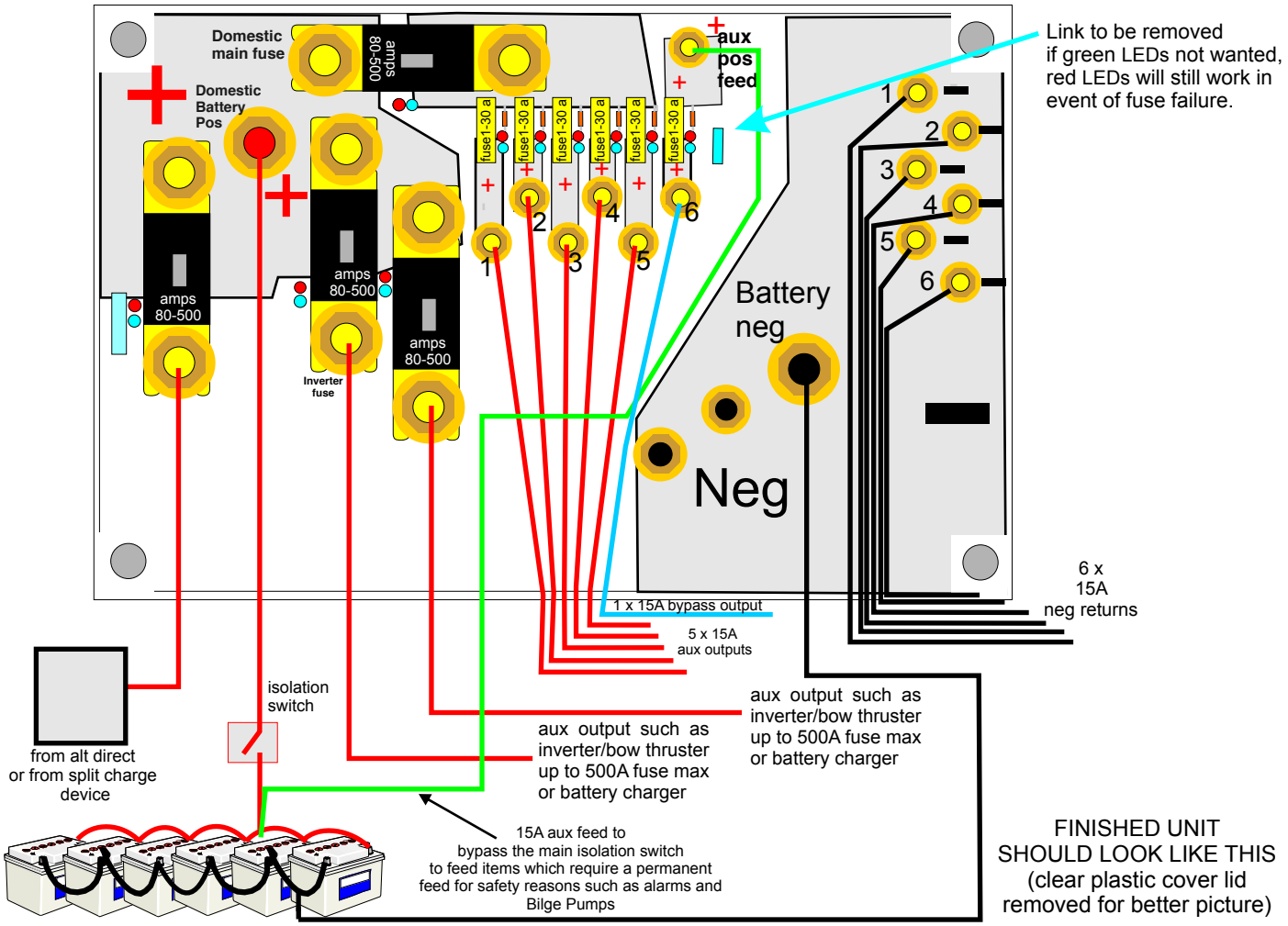
The unit has been designed with 2 main markets in mind:

1) Retail market: for existing boats/specialist vehicles, this box can bring your old system up to a much more modern and safer specification. Fit close to the domestic battery bank and all your fuses are now inside the recommended distance for modern safety standards. It also puts all your fuses in the same area and allows easy testing of faulty circuits.

2) OEM market: if used on a system from scratch, this will reduce the wiring time of any system, replacing the need for many individual parts needing to be fitted and connected whilst also standardising the wiring arrangements saving a lot of time and money.

Key features include:

1) 3 x ANL fused outputs from 80-500A ability (fuses purchased extra, see our gold ANL range for the fuse required).
2) 5 x 15A continuous outputs with 30A fuses (supplied) with one 300 x fuse supplying that section.
3) 1 x 15A 'maintained' output with 30A fuse, extra aux d/c feed position to bypass main feed in event of ancillary equipment requiring a permanent feed even if the main battery bank is isolated, such as alarms or bilge pumps.
4) Emergency alternator link in the event of the alternator fuse blowing (this prevents the alternator being damaged).
5) Green LEDs to show the circuit is live (LEDs on all the time when battery not isolated, can be switched 'off', if preferred, by removing a link).
6) Red LEDs to show when fuse has blown (only on when fuse has blown).
7) Cable guides for the low power cables, plus cable ties to be tightened when wiring complete to keep wires tidy and secure.
8) Small footprint very compact design.
9) Most negatives returned to box to enable easy circuit checks.

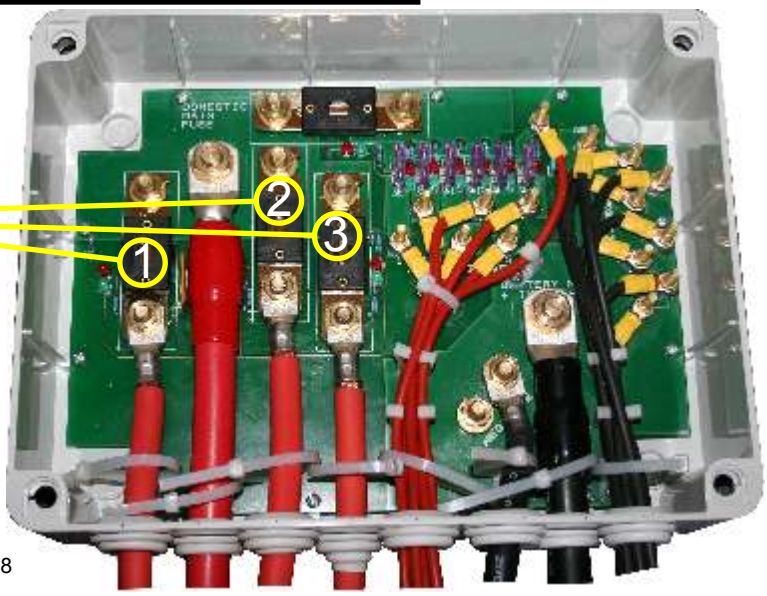


FINISHED UNIT SHOULD LOOK LIKE THIS (clear plastic cover lid removed for better picture)

D/C High Powered Fused Distribution			
Size	**Weight**	**Code**	**Price inc vat**
300 x 220 x 120 mm	1.5kg	PPD500	

3 optional GANL fuses required, please select the required sizes

Fuse	Code
80 amp	GANL80
100 amp	GANL100
150 amp	GANL150
200 amp	GANL200
250 amp	GANL250
300 amp	GANL300
350 amp	GANL350
400 amp	GANL400
500 amp	GANL500



Automatic / Manual a/c Power selector switch

3 input 32A / 110/230V a/c auto selector with remote control

Make your own combi tailored to your needs

Generator
(UP TO 8000 WATT CONTINUOUS
32 AMP 230 VOLT A/C , FUSED ,OR OTHER SOURCE)

Inverter
(UP TO 8000 WATT CONTINUOUS
32 AMP 230 VOLT A/C ,FUSED, OR OTHER SOURCE)

Shore Supply
(UP TO 8000 WATT CONTINUOUS
32 AMP 230 VOLT A/C , FUSED, OR OTHER SOURCE)

Boat/vehicle electrics

Pro switch 32 amp 110-230 v a/c auto crossover

Description	Part nos
Main control box	AC32A
Extra 230V / 20A contact relay	CON1

The new simple power selector offers many new features not available on the older 16A crossover switch, due to its digital control system.
1) 40A internal switch: Switches live and neutral with a 0.25s time delay between switch 'off' and 'on', to prevent wave doubling of the voltage and destroying sensitive equipment.
2) Multiple internal power sources: The system powers itself from each attached power supply; and not from the boats/vehicles D/C system. This is to ensure the system will work even if your batteries are flat. There is no point having an A/C selector switch powered from the D/C system, because if the D/C system fails then you cannot switch the system onto charge the batteries. The Sterling system obtains its control power from each input source, so preventing this problem.
3)Sequential switching: The unit has a simple operation mode; channel 1 is the priority, then channel 2, then 3. In other words if you allocate the inverter to channel 3 then plug in the shore power on channel 1, the switch will automatically switch the system to the shore power etc.
4) Lock out circuit : It is assumed that channel 3 would be your inverter (it could be another power supply depending on how you wire the system up). With a lower power inverter you may not wish your immersion heater or battery charger to work when the inverter is online; so connected to this circuit is a small relay which can break the control circuit on an external switch/relay block. This then allows you to wire the battery charger and immersion heater to a separate connector block, preventing these items being online when the inverter is operational.
5) Remote control: The remote control will tell you which circuit is the current power circuit; and, if the light is flashing, then it will also show if power is available on another circuit. There is also a fault light.
6) Faults / Reverse polarity check: The unit will show if there is a reverse polarity on channel 'A' which is assumed to be the shore supply system.
7) Internal fuses: The control box has 6 internal fuses; one on each live and neutral, so that even in the event of a reverse polarity the neutral line is also fused for safety reasons.
8) Remote on/off. This switch enables the shore power to be switched 'off' (the priority circuit) in the event of the shore power not being powerful enough to do a specific job, for example, if your shore power was limited to say 5A (about 1.2 KW) but your immersion heater/washing machine may be 3000W, you may wish to shut down the shore supply and allow the more powerful inverter or an onboard generator to do the job.
9) 230V or 110V or a mixture of each can be used at the same time, ensuring operation in all the worlds different power supply conditions.
10) Other features includes a 10 sec time delay on the generator line to allow generator start up.

230 V manual 16-30-50A 3 way cross-over switch

ideal where 3 power sources are used such as inverters, shore power and generators on a boat/vehicle

Easy to install
Front panel waterproof
Easy to use
Supplied with 2 shafts for thin panel mounting and ½" panel mounting

Pro switch 32 amp 110-230 v a/c auto crossover

Input sources	Output	Continuous Amps	Max Voltage	Number of poles	Part nos
3	1	20	300	3	SC20A
3	1	32	300	3	SC32A
3	1	50	300	3	SC50A

Electric Vehicle Charging Station & vehicle receiving interlock

J1772 / IEC 62196-2 Wall mounted, programmable from 6-30A 230V

One of the most common complaints about an electric vehicle is the recharge time
This is not helped by the fact the most mainstream electric cars (e.g. Nissan Leaf)
comes standard with a restricted 230V charge lead to recharge the vehicle at
home.
The charge lead provided with vehicles is designed to be portable, it must be mad
to be safe to be used in a conventional 13A household plug and socket
arrangement (one would find at home). In order to achieve this the charge lead ha
a restrictor built into the cable which sends a signal to the vehicle charger to work
no more than 10A. This restrictor is there so as not to overload the 13A plug and
socket. The end result of this safety restriction means that the charger will only
return about 10 miles recharge per hour, with a full battery recharge taking about
10-11 hours. However, in the case of the Nissan the actual in built vehicle charger
can work at about 16A. This is a massive 60% higher than you can access using
the standard charging lead provided by Nissan.
Access to the full charge capability allows the car to recharge at about 16 miles
recharge per hr and recharge an empty battery in approximately 6.25 hours -
a massive 37% improvement.
In order to access this untapped potential one must obtain a larger power supply
than the conventional 13A, most houses / offices have a 32A ring main which can
usually be easily tapped into, however, only 16A of which would be used (for the
Nissan Leaf).
Simply connect the Sterling Electric Vehicle charge station to the large power
supply cable then the full charing potential can be achieved. This allows longer
commuting distances to work (just have a station at work) or more effective
daytime opportunity charging at home. I.e. If you are a bit short on distance, a 1
hour plug in over lunch time will give you an extra 16 miles driving range.

Technical flexibility: This unit can be used on any power available from 6-30A AC 230V. The internal switch settings allows you to preset what actual power you have available from you're a/c power source. This safely protects your power source cabling. Most power settings will be about 10-30A (as this is the standard current available within easy access). Also, most actual vehicle chargers are less than 16A (to date, but this will increase over the years). However, the unit has future proof upgrade ability built in and can be simply adjusted up to 30A if required (N.B the power setting refers to the power supply available and not the ability of the car's charger, the power supply can be well in excess of the vehicle's internal charger and this will not damage the vehicle charger).

How does this work? The unit has pre-programmed dip switch setting linked to specific currents, this sends a signal down the 2 small connectors in the electric vehicle plug. This signal (same protocol is on all electric vehicles) informs the vehicle charger what the power limitations of the system are. The vehicle adjusts its power to suit the setting requested from the control box.

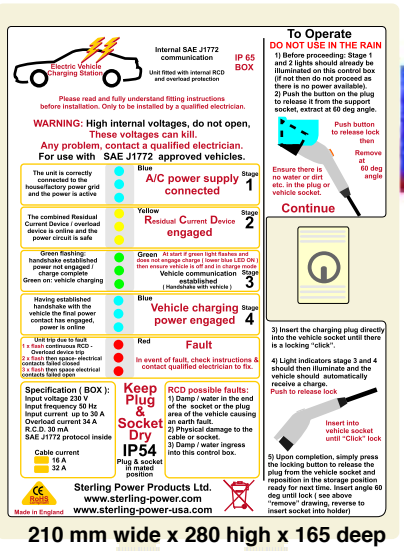
Vehicle interaction (timer) , as this unit is fully compatible with the vehicle's system then the vehicle onboard timer can be used to ensure your vehicle is charged at the best available electric tariff.

Safety

There are 2 main safety systems on this type of unit:
1) The high voltage cannot be activated unless there is a firm connection between the plug and the car. This connection is confirmed by a protocol handshake acknowledged by the vehicle's onboard system. Only then will the AC power be engaged. This then immobilizes the vehicle.
2) The box is fitted with a 230V 30 mA RCD combined with a 40A trip which, in the event of an earth leak (due to cables becoming damaged or water in the plugs etc.), will automatically trip the system or, in the event of short circuit, will trip the unit.

Security: The unit comes as a wall mounted weather proof, locked steel box with a **large information panel giving operation and safety instructions**. The Illuminated socket holder allows easy use at night, a remote operation circuit allows an external timer or pay box to be attached to this unit if this is a requirement.

Installation: The Sturdy steel box is more adaptable to a professional installer's needs. All that is required is a simple power feed from the office / house.



210 mm wide x 280 high x 165 deep

Future Proof

Compatibly with all major electric vehicle companies

60 %
Higher charge rate on Nissan Leaf

standard 5 metres cable (special order for longer cable)

30A adjustable SAE J1772 (protocol) charge station

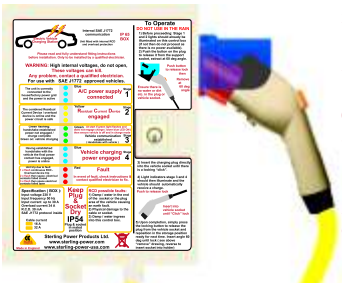
- inc SAE J1772 handshake establishing protocol module
- Residual Current Breaker (RCD)
- Overload Protection
- Blue LED illuminated socket holder
- 9 user selectable current limits from 6-30A
- Sturdy wall mounted secure steel box
- Clear 5 sequence status LED information Panel
- Fault LED information and safety instruction label
- External timer / meter box control attachment
- Extraction control (if required)
- Designed and made in England
- Bespoke product layout available

Amp Limiter settings
0 = 6 A
1 = 10 A
2 = 12 A
3 = 13 A
4 = 15 A
5 = 16 A
6 = 20 A
7 = 25 A
8 = 30 A
9 = RESERVED

Specification for EV plug and socket

Voltage 230V(nominal)
Withstand test voltage 2000V
Current 16A and 30A models
Mating cycles (over 10,000)
Mated retention force to unlock 40-80N
to lock 160N
Operating temperature -40 to 75 deg C

Electric vehicle charge station (wall mounted)



- Steel wall mounted box
- 30 amp control unit ability
- 16 or 32A cable and socket
- 5 led information panel
- Earth fault protection
- overload protection
- SAE J1772 protocol
- Blue back light socket holder
- Remote on / off ability
- 5 meters 16A cable
- 9 current limiting selector switch

Accessories which can be purchased separately

EV socket with or without cable 16A and 32A available

Socket support LED back lights

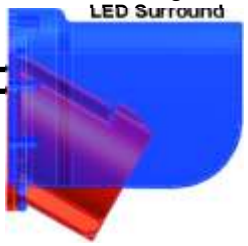
Plug with rear cable support 16A and 32A available

Part number	Description
EVW16A5M	Electric Vehicle Wall mounted charge station Metal box with earth /overload device, plus SAE J1772 protocol, plus 5 metres 16A cable
EVW32A5M	Electric Vehicle Wall mounted charge station Metal box with earth /overload device, plus SAE J1772 protocol, plus 5 metres 32A cable
EVP16AC	SAE J1772 16 amp plug plus 5 meters of 16 amp cable
EVP32AC	SAE J1772 32 amp plug plus 5 meters of 32 amp cable
EVP16A	SAE J1772 16 amp Plug only (Unchen
EVP32A	SAE J1772 32 amp Plug only (Unchen
EVPSL	Plug support holder with internal LEDS
EVS16A	Electric vehicle socket 16 amp
EVS32A	Electric vehicle socket 32 amp
EVVE	Electric vehicle vehicle immobilise (for new build vehicles only) (sterling part , cost ?????

Charging station wiring

Optional (not supplied)
External pay meter
or timer if required

Blue light
LED Surround



Input power:
230 v 50 hz a/c
up to 30 amps

Mains Input
L
E
N

Live to RCD/overload

Neutral to RCD/ overload

Amps Limiter Selector

TIMER

Remote switch in event of Pay meter or Timer required (Close to activate)

SAE J1772 30 amp module

Earth to metal case

Earth to metal DIN rail

Vehicle PILOT

Power feed for L.E.D. lights for plug holder

13.6 v 25 ma
LED feed

To Vehicle cable and plug
L
E
N

Live from RCD

Neutral from RCD

FAN
230VAC 30VDC 1A

Optional external cooling fan (No Volt relay contact) as per SAE J1772

Amp Limiter settings
0 = 6 A
1 = 10 A
2 = 12 A
3 = 13 A
4 = 15 A
5 = 16 A
6 = 20 A
7 = 25 A
8 = 30 A
9 = test mode

Earth Leak
detector 30 mA
and
Overload
detector 30 A

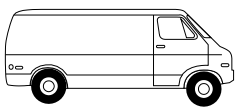
On board vehicle **SAE J1772** receiving / control and vehicle immobilization unit
(only required for new OEM build units)

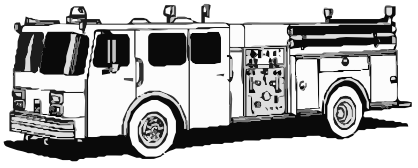
Oem vehicle

Onboard Charger

Current Limit switch

Vehicle immobilised during connection





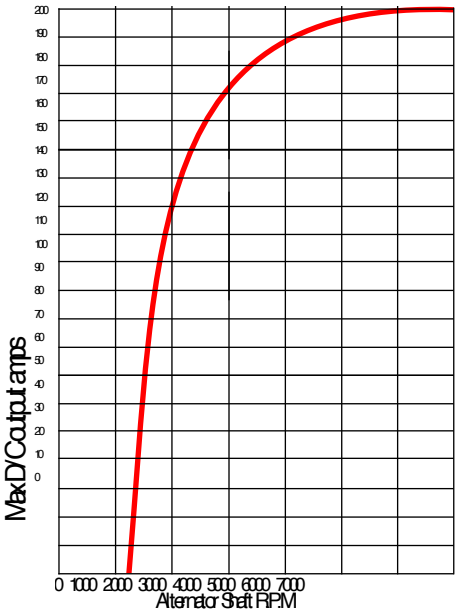
www.sterling-power.com
www.sterling-power-usa.com

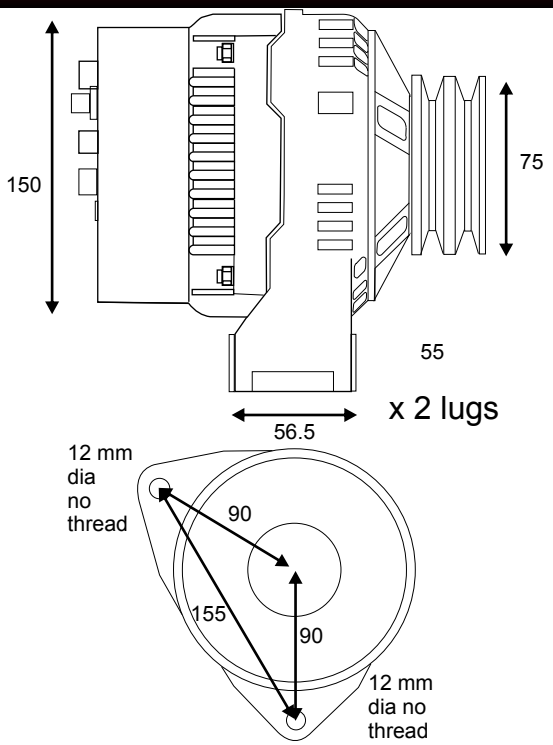
High power performance alternators

12V / 200A

GOOD LOW R.P.M. PERFORMANCE

Description	Part nos
12 v 200 amp alternator with standard reg	AL12200
12 v 200 amp alternator with standard & PDAR	AL12200PDAR





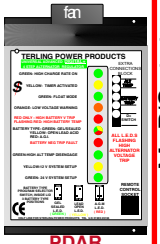
12V / 145A

GOOD LOW R.P.M. PERFORMANCE
alt supplied with multi v and twin v pulley
photo shows multi v

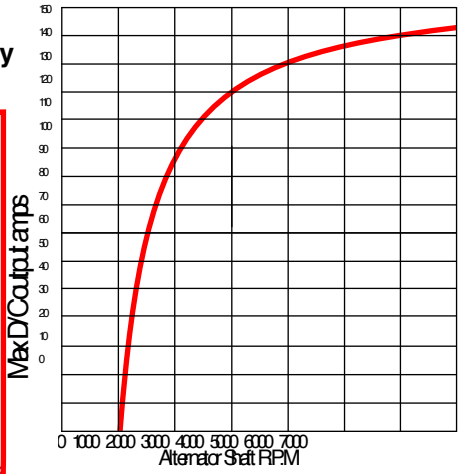
Description	Part nos
12V 140 amp alternator with standard reg	AL12140
12V 140 amp alternator with standard & PDAR	AL12140PDAR

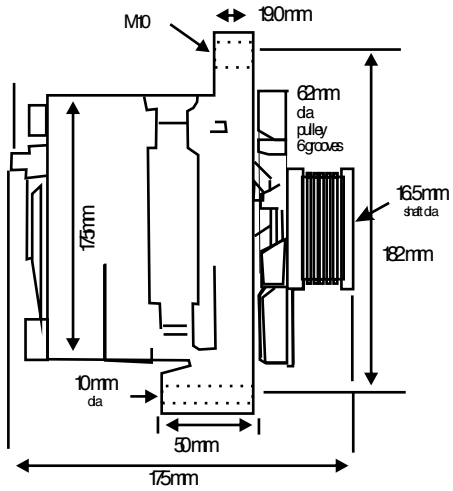
CS144 Delco

with or without the best advanced alternator reg on the market



PDAR DIGITAL 4 STAGE ADVANCED ALTERNATOR REGULATOR

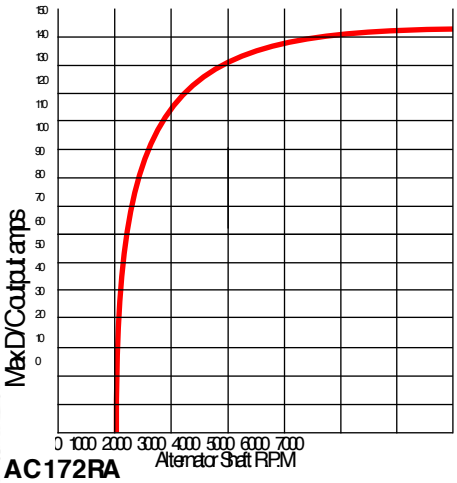


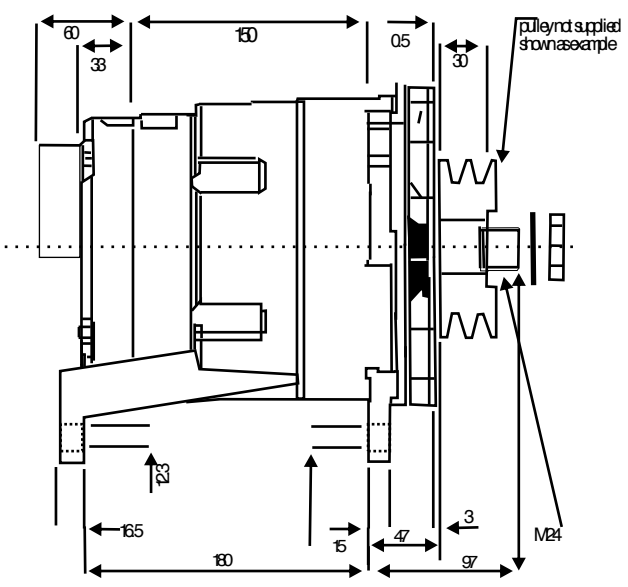


24 v 140 amp

GOOD LOW R.P.M. PERFORMANCE

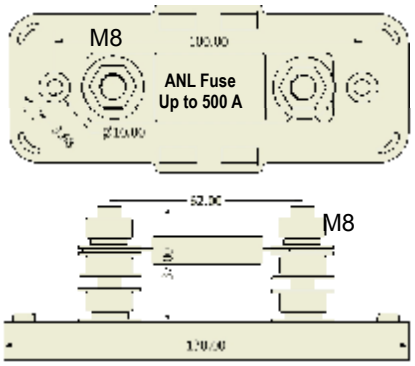
Description	Part nos
24 v 150 amp alternator with standard reg	AL24140
24 v 150 amp alternator with standard & PDAR	AL12140PDAR



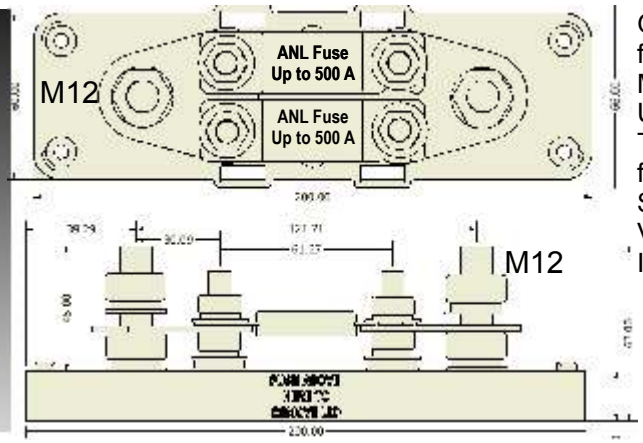


AC172RA
Bosch 0120 689 520
Prestolite 1277640
Equilivent product part numbers

M8 (up to 500A) & M12 (up to 1000) ANL Gold plated fuse holders

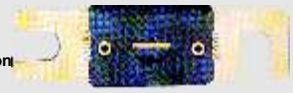


Gold plated & stainless fittings (non ferrous).
M8 cable connector.
Up to 500A fuse ventilated cover protection.
Isolated rear protection.



Gold plated & stainless fittings (non ferrous).
M12 cable connector.
Up to 1000A of fuses.
Twin or single fuse function
Single or twin output.
Ventilated cover protection.
Isolated rear protection.

Full range of Gold plated ANL fuses See Sterling Gold section



Part Number GANL(x*) (AMPS)
With mica window
*x = 80A , 100A, 150A, 200A, 250A, 300A, 350A, 400A, 450A, 500A

M8 Gold ANL Fuse holder (no fuse included)

Main connector	Max amps	Size mm	Weight	Part number
8 mm	500	145 L x 55 W x 53 H		GANL500
12 mm	1000	200 L x 66 W x 69 H		GANL1000

Digital Battery Tester includes alternator and starter motor tests

1000 amps cold cranking battery
140 amp hr battery
125 amp load

What does the tester do?

Simply measuring battery voltage is not a true indication of the state of a battery. A battery test has 2 aspects to it: There is the voltage of the battery (which is a rough indication if the battery is fully charged). Then, there is the ability of the battery to hold and deliver the power it has stored. I.e the voltage could show the battery is fully charged but the battery could be badly sulphated and useless. You need to test the voltage of the battery under a heavy load condition.

The load test. Depending on the size of the battery, this product adds a very high load to the battery (125 A). The battery should be able to deliver this load and hold the voltage up at the same time. If the battery is unable to deliver the load (and sustain it for this time frame) then the battery is either defective or simply not fully charged when the test was performed. This is why it is crucial to ensure the batteries are fully charged before the test is performed to eliminate that possibility.
To test simply connect the unit to a 12V fully charger battery, adjust the CCA (cold cranking amps) on the screen up to 999A, then press the load button and perform the 10 second test. The unit will inform you if the battery is good, weak or bad.

The unit can also be used to measure the performance of the charging device (alternator / battery charger) - to inform the user whether the charging device is good, weak or bad.

Digital battery tester

Size mm		Weight	Part number
280 L x 100 W x 120 D	630mm cable (handle to end of clamps)	1.1 kg	DBT125

Specifications Battery Load Tester.

Heavy duty leads and clamps.

125A test load.

Suitable for 1 x 12V battery per test, for 24-36V or larger simply split the battery bank split down to 12V sections for test.

Battery from 200-1000 cold cranking (CCA).

Battery from approx 30-140Ah rating.

Indicates extent of battery sulphation / battery condition.

Battery voltmeter.

High voltage load test safety trip at 13V.

Fast 10 second load tests (2 min wait between tests).

Test 12V alternators and starter motors

BATTERY TERMINALS sets (come in pairs)

GBT-600PN	GBT-1000PN	GBT-100PN	GBT-700PN
8 mm bolt 80g	10 mm bolt 100g	8 mm bolt with WING NUT 110g	10mm CABLE CLAMP 95g

SOLID BLOCK POWER DISTRIBUTION

Ideal for negative returns

Footprint 105 mm x 65 mm | Footprint 105 mm x 65 mm | Footprint 90 mm x 5 mm

GPB-102468	GPB-1044	GPB-2488
CABLE DIAMETERS 1 X 12 mm 2 X 10 mm 6 X 8mm 407g	CABLE DIAMETERS 1 X 12 mm 4 X 10 mm 431g	CABLE DIAMETERS 2 X 10 mm 8 X 8mm 232g

FUSE BLOCK SERIES FUSE TYPE AMT RANGE 20-80A 0-32 V MAX

Ideal for fused high current positive distribution fused outputs

Footprint 110 mm x 80 mm | AMT Fuse Type | Footprint 110 mm x 80 mm | Footprint 110 mm x 45 mm | Footprint 105 mm x 55 mm

GMFB 4848	GMFB 3448	GMFB 2828	GMFB 1428
4 X 6mm IN AND FUSED OUT 320g	3 X 10 mm IN (SOLID) 4 X FUSED 6mm OUT320g	2 X 6mm IN AND FUSED OUT 170g	1 X 10 mm IN 2 X 6 mm OUT 170g

FUSE BLOCK SERIES FUSE TYPE ATQ RANGE 3-35A 0-32 V MAX

Ideal for lower current positive distribution fused outputs

Footprint 90 mm x 65 mm | ATQ Fuse Type | Footprint 90 mm x 65 mm | Footprint 85 mm x 40 mm | Footprint 85 mm x 40 mm

GATC 4848	GATC 3448	GATC 2828	GATC 1428
4 X 6 mm IN AND FUSED OUT 220g	3 X 10 mm IN (SOLID) 4 X 6 mm FUSED OUT223g	2 X 6 mm IN FUSED OUT 115g	1 X 10 mm 2 X 6 mm FUSED OUT115g

FUSE BLOCK SERIES FUSE TYPE AUE 1-80A 0-32 V/125V/250V

Positive fuse distribution where ignition protection regulations apply for R.C.D or U.L directives

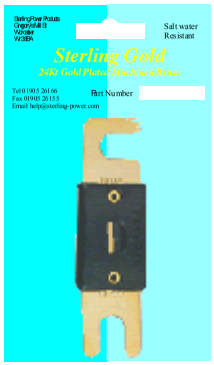
Footprint 105 mm x 80 mm | AUE Fuse Type | Footprint 105mm x 80 mm | Footprint 105 mm x 55 mm | AUE-L Fuse Type Option | Footprint 05 mm x 55 mm

GFB 3448	GFB 4848	GFB 2828	GFB 1428
3 X 10 mm IN (SOLID) 4 X 6 mm FUSED OUT 410g	4 X 6 mm IN 4 X 6 mm FUSED OUT 371g	2 X 6 mm IN 2 X 6 mm FUSED OUT 203g	1 X 10 mm IN 2 X 6 mm FUSED OUT 228g

24Kt Gold Plated

All products are precision machined from solid brass with a 24Kt gold finish. Do not confuse with lower cost zinc-lead alloy die-casting.

All pre-packed



All pre-packed

SINGLE FUSE BLOCK SERIES FUSE TYPE ANL 60-500A 0-32 VOLT

Used for large inverter's, bow thrusters, engine feeds and any other high current application

Waterproof unit UL approved

Footprint 105 mm x 65 mm | Footprint 185 mm x 55 mm

GANL 1	GANLW 1
1 X 12 mm IN 1 X 12 mm FUSED OUTPUT 290 g	1 X 12 mm IN 1 X 12 mm FUSED OUTPUT 340 g

SINGLE IN LINE FUSE HOLDERS FOR AUE FUSE

Footprint 90 mm x 20 mm | AUE Or AUE-L Fuse Type | Footprint 80 mm x 35 mm

GFH-04-1	GFH-168	GFH-80
Single AUE fuse holder 10mm cable with eye Bolt for battery terminal 50g	Single AUE fuse holder 10 mm cable in and fused out 50g	Single AUE fuse holder suitable for ring terminals comes with 80 amp fuse plus spare fuse in internal holder can be used with all AUE fuses 50g

NEW RING CONNECTOR TYPE

BUSS BAR LINK INCLUDED | BUSS BAR LINK INCLUDED | Same as GANL1 but suitable for ring terminal fitting

FUSE TYPE RESET or ATQ	FUSE TYPE AUE+AUEL	FUSE TYPE ANL	SOLID BLOCK RING
Footprint 148mm x 110 mm	Footprint 148mm x 110 mm	Footprint 90 mm x 60 mm	Footprint 100 mm x 60 mm

GMFBR	GFBR	GANLR	GPBR
4 X Holder for RESET FUSE and AMT fuse range	4 X holder for AUE fuse range	Fuse holder with ring terminals for GANL fuse	Solid connector block with ring terminal connectors

FUSE SERIES 24 KT GOLD PLATED

2 FUSES PER PACK | 2 FUSES PER PACK | 2 FUSES PER PACK | 1 FUSE PER PACK

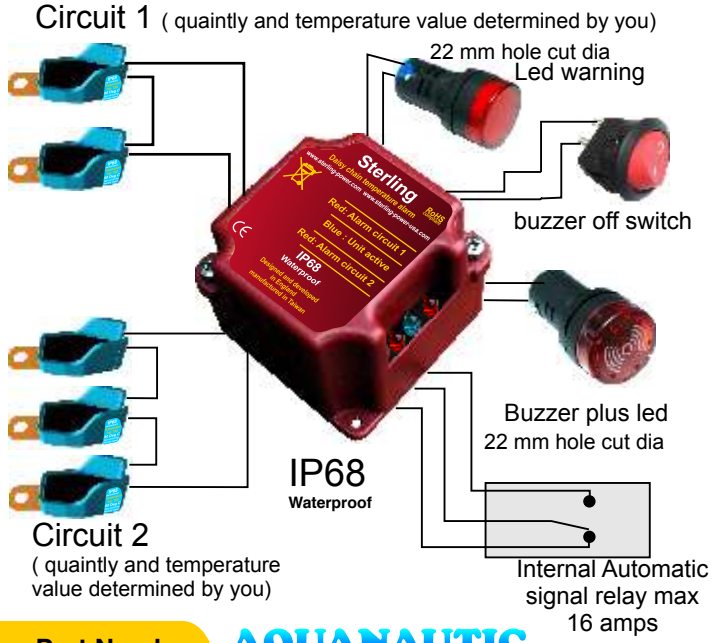
ATQ /? AMPS	GAMT /?AMPS	GAUE /?AMPS	GAUE-L /?AMPS	GANL /?AMPS
3A VIOLET 5A TAN 10A RED 15A LT BLUE 20A YELLOW 30A LT GREEN 35A PURPLE	20A YELLOW 30A LT GREEN 40A ORANGE 50A RED 60A LT BLUE 70A TAN 80A CLEAR	2A 4A 6A 10A 15A 20A 25A 30A 40A 50A 60A 70A 80A	Built in light which lights up when fuse blown 2A 20A 4A 25A 6A 30A10A 40A 15A 50A 60A	Mica window 80A 250A 100A 300A 150A 350A 200A 400A 500A

Digital Daisy Chain Temperature alarm IP68

Why would I want this device ?
Most problems caused on engines systems , batteries, hydraulic systems, bearing etc can be pre empted and stopped before a catastrophic failure assuming one can diagnosed the fault by a temperature rise at a specific place on the apparatus. This unit simply allows you to install a pre determined digital (on/ off) temperature sensor on the item in key places so in the event of a temperature exceeding that preset then a alarm goes off and a relay allows you to engage an action if required if the alarm is not enough.
The system does not display the actual temperatures it's a trip/warning device to indicate when a safe working temperature has been exceeded and requiring a response from you or a pre set automatic response.
Sterling has a more expensive version which looks at actual temperature and temperature rise etc and has remote display for the temperatures , look at the Sterling Voltage Temperature monitor .
This product should be seen as a final response alarm where some major action is required to save the day .
A range of Digital temperatures are available 40 - 60- 80- 100-120-150 deg C you pick and mix, it need not even be our sensors, it could even be a burglar alarm or a door sensor, in fact any sensor which goes from a closed circuit to a open circuit will alarm the unit.

How does it work:
This is a very basic unit which simply allows 1 to 100 digital normally closed switch temperature sensors to be added in series, if any one of the sensors alarms (open circuits) then the common alarm is activated . the temperatures can be mixed in the chain or just one its up to you .**Where would I use this ?**
Say for example you were having battery over heating problems (common if one battery out of a bank of batteries becomes defective) and goes to over charger and over heat then a 60 deg sensor on each battery would indicate this, or maybe your worried about the water cooling in your exhaust system on you boat failing then a 120 deg c sensor on you exhaust would tell you this, or you sea water cooling pump has failed a 40 deg c on the pump would tell you this, may be your stern bearing has caused problems in the past, or your hydraulic pump has overheated in the past.
There is no limit to the mixture of temperature you use or how many you use, the only thing to bare in mind is the more you use the less specific the alarm is, eg if you fit 10 in a daisy chain then which one out off 10 alarmed?

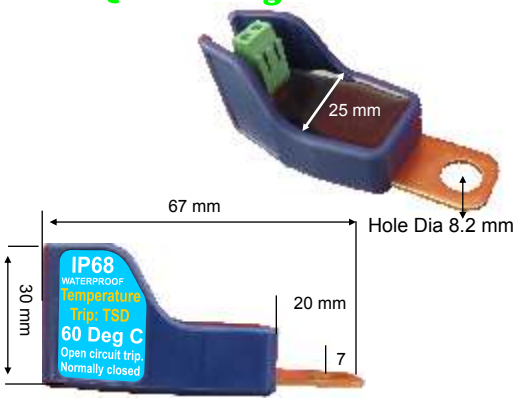
Key features,
There are 2 daisy chain circuit, add as many temp sensors as you want in any temperature mixture, or other alarms such as door opening etc etc
3 leds to show normal use and which circuit is alarming
Remote buzzer connection and buzzer supplied (more can be added In parallel if required as optional extra
Remote LED connection and 1 supplied, again more can be added if required as optional
Alarm silence switch
3 output (signal relay) from relay to offers normally closed circuit or normally open circuit which is reversed on alarm for remote product activation in event of an alarm, to be used however suits your application ie switch off a engine or shut down a piece of equipotent .



Item description:	Part Number
12V Connection box plus 1 x Remote LED , Switch (alarm off) and Buzzer.	TSB12
24V Connection box plus 1 x Remote LED , Switch (alarm off) and Buzzer.	TSB12
Temp sensor IP68 waterproof **(No temp sensors supplied with unit)**	
50 deg C = 122 deg F Digital temp sensor	TSD50
60 deg C = 140 deg F Digital temp sensor	TSD60
70 deg C = 158 deg F Digital temp sensor	TSD70
80 deg C = 176 deg F Digital temp sensor	TSD80

In the event a temperature or other warning device is required which is outside the scope off our standard range then any other companies temp sensor can be used as long as it's a normally closed (electrical circuit) and opens for the alarm , it can then be used with this product

AQUANAUTIC
Water proof range



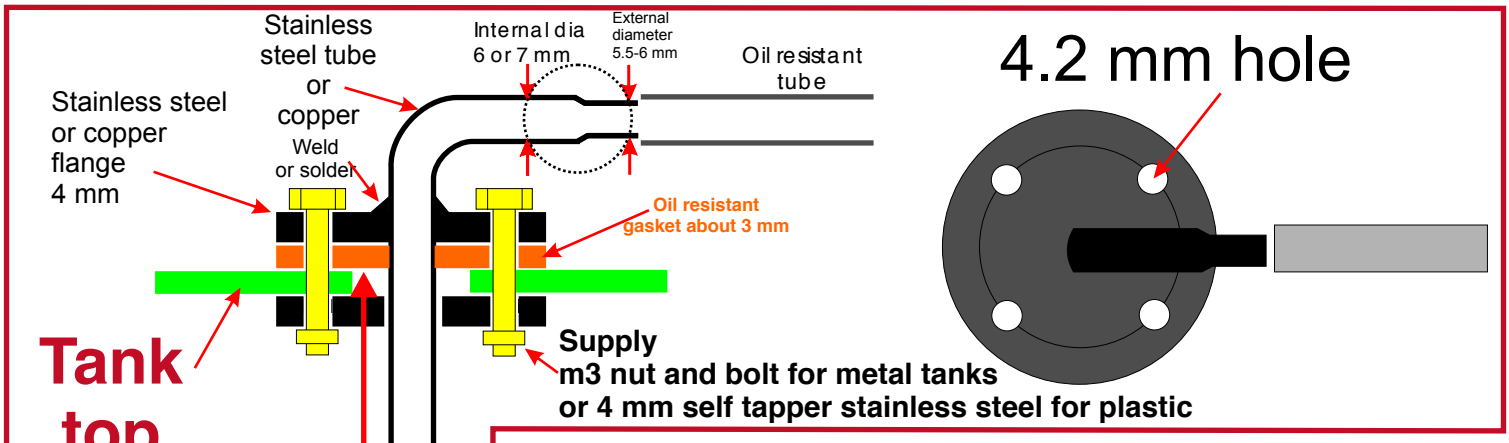
Pure Sine wave inverters (telecom grade) Pro Power S

230 v 50 hz Pure Sine wave (telecom standard wave form)

Socket type	Voltage d/c	Power(continuous)	Size L x W x D mm	Weight	Part nos
Universal	12	200 watts	230 x 120 x 75	1.4	SI12200
Universal	12	350 watts	230 x 120 x 75	1.7	SI12350
British/Euro	12	700 watts	290 x 175 x 80	3.5	SI12700
British/Euro	12	1000 watts	340 x 175 x 80	4.1	SI121000
		with remote control (below)			
British/Euro	12	1500 watts	390 x 300 x 100	3.5	SI121500
British/Euro	12	2000 watts	390 x 300 x 100	3.5	SI122000
Universal	24	150 watts	230 x 120 x 75	1.4	SI24150
Universal	24	200 watts	230 x 120 x 75	1.4	SI24200
Universal	24	350 watts	230 x 120 x 75	1.7	SI24350
British/Euro	24	700 watts	290 x 175 x 80	3.5	SI24700
British/Euro	24	1000 watts	340 x 175 x 80	4.1	SI241000
		with remote control (below)			
British/Euro	24	1500 watts	390 x 300 x 100	3.5	SI241500
British/Euro	24	2000 watts	390 x 300 x 100	3.5	SI242000

We have developed the new Sterling pure sine wave, heavy-duty inverter with very high quality wave form, because most sine wave inverters will not run some sensitive equipment. This inverter ensures all electrical products run at their very best. This model is of telecom output standard, and simply the best. It removes all problems linked with even the so called best pure sine wave inverters. It works perfectly with all sensitive equipment which even so called pure sine wave can cause problems with.
The 2000 watt unit is capable of running a standard washing machine and all thyristor controlled devices which cannot be run by quasi-sine. However, if there is a washer dryer then the 3000 would be best. The units all come with a standby circuit which offers a 0.2A consumption with no load and a low online loss of about 1.2A if power saver is not engaged.
The remote control is a standard feature that comes complete with a 10 metre connecting cable.

Pneumatic tank gauge system



0.95 meter can be extended to 2 meters

1 metre Stainless steel tank tube

Weight kg	Part nos
0.05	TGT

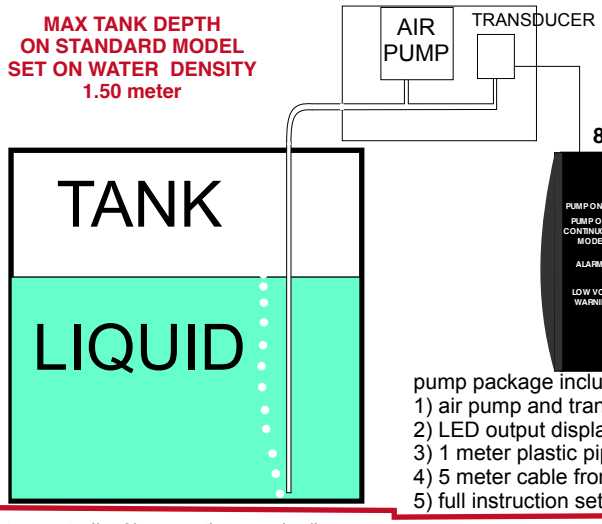
Pneumatic Tank Gauge

Pump / control box must be positioned above the highest point of the tank, i.e. above the filler cap height, in order to prevent liquids from entering the unit and damaging the sensors

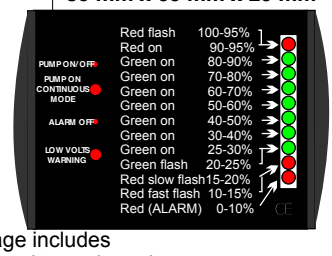
Tank Gauge System Pump Package and LED Display

Size L x W x D mm	Weight kg	Part nos
145 x 90 x 40	0.5	TGS

MAX TANK DEPTH ON STANDARD MODEL SET ON WATER DENSITY 1.50 meter



80 mm x 60 mm x 20 mm



pump package includes
1) air pump and transducer box
2) LED output display
3) 1 meter plastic pipe from pump to tank
4) 5 meter cable from pump to LED display
5) full instruction set

The problem:
Most boats suffer badly from unreliable tank level gauges, this is a particular problem with dirty water tanks. The main problem is the corrosive nature of the salt water in the tank and the fact that float meters are damaged in the tanks.

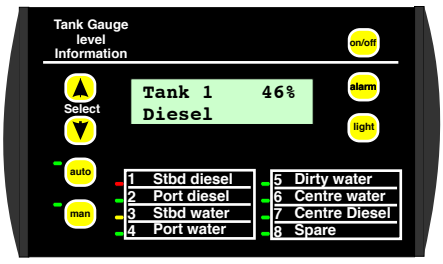
The solution:
The measuring device must not be effected by the movement or the corrosive nature of the fluid it is measuring. The best way to achieve this is the way ships and other quality tank meters work by using pneumatics. This has always proved too expensive to miniaturize for leisure craft use until now.

How does it work?
The new Sterling gauge works on a very simple principle. If you put a small tube to the bottom of any liquid, then pump air through the tube to remove all the fluid from it, then the atmospheric pressure or back pressure on the liquid is directly proportional to the depth of the fluid (taking density into account). For this to work, we need a simple pipe (approx 2-3 mm diameter) from the top to the bottom of the tank, then pump air through the pipe and measure the back pressure of the air (the transducer) and display it on a display panel. Simple?
Well not that simple, we need a compressed air pump with a complex software program control to reduce power consumption to milliamps and to return a highly accurate reading, all at a sensible cost.
The Sterling Tank Gauge is a fully programmable system, where you program in the following information, 1) tank depth 2) fluid density (water, diesel, dirty water, petrol) 3) operation mode (i.e. a water or fuel tank would require the alarms etc to go off when the tank is empty, but a dirty water tank would require its alarms when it is full) with these three pieces of information simply connect the unit to a pipe which is about 10 mm off the bottom of the tank and the L.E.D. display will give a good indication of the depth. For a more accurate analysis the L.E.D display can be connected to the optional L.C.D display which will scan up to 8 tanks and display the depth in % full in rotation, when the fill button is pushed on the tank, for example tank 6, then the L.C.D. display will lock onto that channel.

The system must only be used where the pump sensor unit can be fitted above the level of the highest point on the tank system, i.e. above the height of the deck filler system or a U bend in the tube going above the filler, i.e. in an over fill condition liquid must not run into the unit.

Quick check list

- No moving parts in the tank
- No electricity in the tanks
- Cannot stick corrode or jam up
- Not effected by any corrosive fluid
- Easy to replace or repair if faulty
- No need to test (set up in software program)
- Very accurate
- Alarms adjustable both ways
- Set for water, diesel, petrol, sea water
- Voltage 8-32V
- Self cleaning
- Local and remote readings



Multi tank gauge kit includes
1) 8 tank LCD reader / scanner panel
2) selection of sticky labels with tank names
3) 2 x 10 meter cables for 2 tanks
extra tank cables can be purchased

Tank L.C.D. Display Scanner Unit

Size L x W x D mm	Weight kg	Part nos
90 x 60 x 20	0.2	TGM
Extra 10 meters of cable for pumps		TGL10M
Extra 5 meters of cable for pumps		TGL5M

Zinc savers / Galvanic Isolators

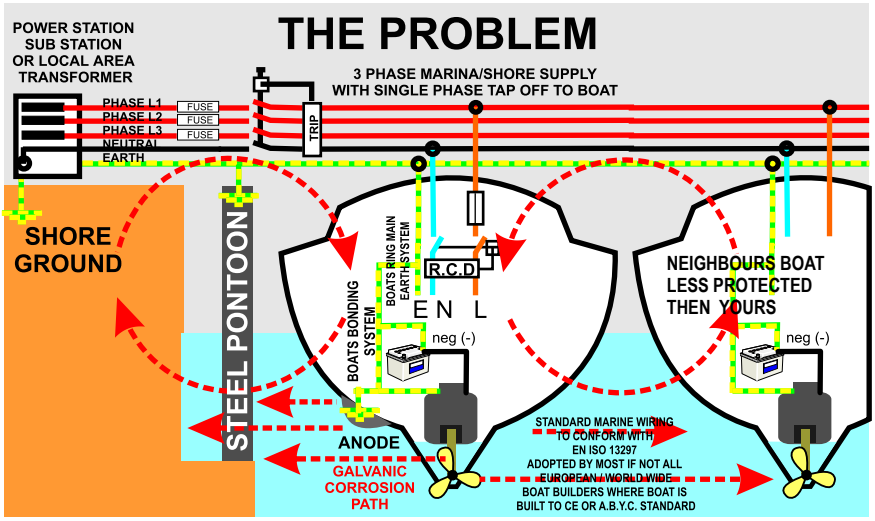
CE and ABYC

THE PROBLEM:

Recent interest in damage done to boats due to the 230V shore mains has highlighted the need to fit a galvanic isolator to your boat.
In order for modern boat builders to comply with modern CE standards such as EN ISO 13297 they must fit the shore earth wire to your boats bonding system which is also connected to the hull / anodes / fuel tanks / engine blocks / shafts / propellers / stern tubes / rudders / rudder glands / water intakes / etc. This ensures that any 230V mains faults will operate the R.C.D on the boat in order to save your life.
The down side of these standards is that electrically speaking your boat is now connected to the rest of the boats in the marina and any other metal structures in the area. Electrically speaking they become one and the same. If you follow the earth line you can see everything bonded to the earth, this includes your boat, the one next to you, metal work etc.
This results in two main problems.
1) Any earth problem on any boat or shore earth will increase the voltage in the common earth cable and dissolve - adversely affecting your boat by dissolving your anodes at an alarming rate (this could result in the total loss of all the metal on the boat below the waterline)

2) Because all the boats are now one, if you have a zinc anode on your boat, but the boat beside you does not or even worse, the marina has not put anodes on its structures (metal pontoons etc) then your boat's zinc (or aluminium / magnesium) will protect all the structures and boats around you, resulting in dramatic zinc loss and expensive lift-outs to replace the zinc. For boats on inland waterways, if you have a magnesium anode and everyone else has zinc or no anodes at all, your magnesium anode will protect all.

ProSave



THE SOLUTION:

The trick is to maintain the continuity with the earth to ensure the safety of your life but remove the continuity with the shore power for the safety of your boat. The solution is very simple. By installing a Galvanic Isolator / Zinc Saver we maintain a good earth link with the shore, but prevent any stray currents coming up the earth line and damaging the boat. The isolator is in theory a simple device but it has to be built to a stringent specification and tested by an independent test house to ensure they comply with the relevant standards, be it the less stringent CE standard or the more stringent American Boating and Yachting Council standard. This means in a major fault condition it can carry its rated current for 24 hours without exceeding 90 deg C on the heat sink.
The Galvanic Isolator has the following extra features:

TOTAL PROTECTION:

Recent upgrades in the new A.B.Y.C. have removed the need for a monitoring system on the zinc saver as long as, if the unit was to fail (which in the excess of 500,000 of the older version sold with 0% failure rate), the internal devices must fail in such a way as to continue to ensure the safe connection of the earth circuit. Having spent a lot of money on a new mono silicon block to ensure the unit will perform as per the new specification and many hrs testing by UL laboratories, the new Pro Save FS (see next page) is now fully certified as a fail safe device and as such no longer needs any monitoring system. This ensures a simpler and lower installation cost for this new product.

ProSave A

By far the most common used device in Europe, complies with all the requirements, and is also low cost and very effective.

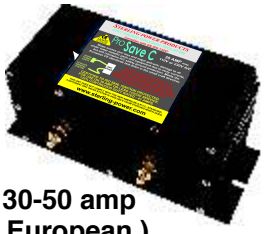
16-30-50 amp
(European)

16 amp version

Galvanic Isolators / zinc savers Standard euro version			
Amps	Size mm	Weight kg	Part nos
16	120 x 100 x 90	1.0	ZS16A
30	220 x 120 x 100	1.5	ZS30A
50	220 x 165 x 100	1.8	ZS50A

ProSave C

Looks the same as the Pro Save A except has an internal 25,000 uF 2.5 V capacitor to raise the performance of the unit in extreme A/C leakage conditions.

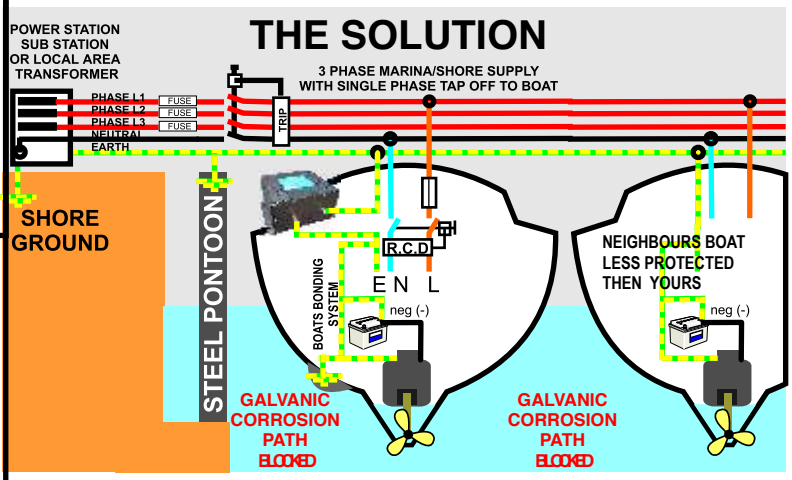


INTERNALLY INSTALLED
25,000 uF
2.5v

30-50 amp
(European)

Galvanic Isolators / zinc savers standard euro version with Cap			
Amps	Size mm	Weight kg	Part nos
30	220 x 120 x 100	1.5	ZS30C
50	220 x 165 x 100	1.8	ZS50C

Suitable for use in Europe and the rest of the world except the U.S.A if ABYC compliance is required.



Pro Save W 32A, 64A & 110A
Galvanic Isolator/Zinc Saver

Waterproof, Light weight, low footprint, Ignition protected
IP55 Induction fan cooled, 2 x warning LEDS

The new Pro Save W offers all the same great protection as the other Euro models but in a new waterproof plastic package with stainless steel hardware an very low footprint, made possible by a new induction fan cooling system which only operates when the unit is in a major fault condition, this ensures that in full fault condition the product does not exceed 90 deg C, during tests the product 24 hr fault temperature was sustained well below. The new range also offers two LED warning lights. The two warning lights indicate the following:

1) To indicate if there is a break through fault, ie the earth voltage has exceed the ability of the device to protect the boats system (very rare this would ever be the case)

Unit rated to sustain full fault + 20% current for 24 hrs at 50 deg C & not exceed 90 deg C

2) Total failure due to massive short circuit way beyond the products ability to protect, and the product has failed and the boat and personnel are in danger. If a boat and shore power systems have normal conventional safety devices (Fuses-trips etc) installed its simply not really possible to destroy this product under any fault condition without some other underlying event or an incorrectly rated product on the circuit. The over engineered aspect of this product cannot be overstated.

Safety first:
This product complies fully to European standard EN ISO 13297, but should not be used on any boat where a UL certificate or ABYC standard is required see below product for UL / ABYC fail safe standard .

EN ISO 13297
Small Craft Directive

CE RoHS compliant

IP68
WATERPROOF
Electrics
IP55
Replaceable fan

110 x 155 mm (footprint)
120 mm high 1.0 kg

170 x 155 mm (footprint)
120 mm high 1.8 kg

Waterproof Zinc Saver off fault plus 20%
32A at full fault current (41 amps)after 24 hrs temp = 65 deg C
64A at full fault current (85 amps) after 24 hrs temp = 78 deg C
110A at full fault current(152 amps) after 24 hrs temp = 75 deg C

Waterproof Galvanic Isolators / Zinc Savers

Amps	Size mm	Weight kg	Connector	Part no
32	150 x 120 x H 118	1.0	6 mm	ZSW32
64	150 x 120 x H 118	1.0	6 mm	ZSW64
110	155 x 170 x H 118	1.8	8 mm	ZSW110

Pro Safe FS 30 & 60A Fail Safe to the latest A.B.Y.C specification tested by UL
Suitable for use for boats being exported or used in the U.S.A.

UL Certified
205007

ProSafe FS installs easily and does not require a dedicated monitor to verify the operational status of the galvanic isolator as required by non Fail Safe Certified galvanic isolators.

ProSafe FS 30 & 60 are built on robust FlatPack semiconductor platforms ensuring that in the event of a failure, the failure is safe by not compromising the ground continuity on-board when connected to AC shore power.

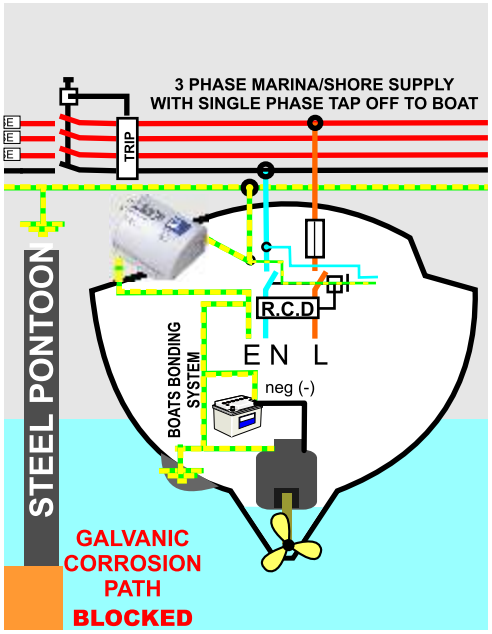
ABYC A-28 July '08 Compliant and Fail Safe Certified.
Certified by Underwriters Laboratories (UL). Insures shore power safety ground wire is maintained through the isolator.

Flat Pack High Power Semiconductors
Robust high power diodes allow the FS Series to meet the new Fail Safe criteria for conducting inrush currents of 5,000 amps for the required duration period.

Innovative Design
The FS 60 will cool itself in the event it must conduct current insuring cooler operation in this mode.

Ignition Protected
Meets ISO 8846 and can be mounted within an engine compartment

Gold Plated Terminations



120/240 VAC / 42A max/ 50 or 60 Hz

For 30 Amp Shore Cord Applications

Specifications:	
shore cord inlet compatibility	Single 15,16,20 or 30
ratings VAC/Max AMPS/Hz	120/240 VAC/41A 50 or 60 HZ
max unit temp	50 deg C
size L x W x H mm	175 x 185 x 65
weight kg	1.5 kg

120/240 VAC / 82A max/ 50 or 60 Hz

For (1) 50 Amp or (2) 30 Amp Shore Cord Applications

Specifications:	
shore cord inlet compatibility	Single 50 or dual 15,16,20 or 30
ratings VAC/Max AMPS/Hz	120/240 VAC/41A 50 or 60 HZ
max unit temp	50 deg C
size L x W x H mm	190 x 165 x 95
weight kg	1.8 kg

LATEST A.B.Y.C. PROTECTION

Galvanic Isolators / zinc savers Fail Safe New ABYC

Amps	Size mm	Weight kg	Part nos
30	175 x 185 x 65	1.5	ZSFS30
60	190 x 165 x 95	1.8	ZSFS60

Yacht Corrosion Monitoring Equipment and Work Book

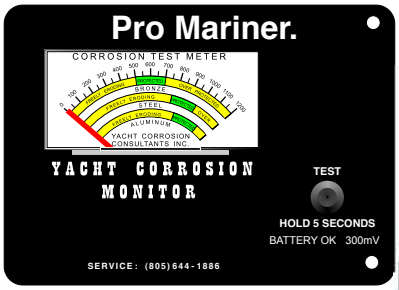
This equipment highlights any electrical and electrolytic problems which will cause expensive corrosion on a boat

The Corrosion Test Kit comprises of an easy to follow instruction manual. This includes survey report documents. The kit also includes the required test meter and silver/silver chloride test leads. The portable meter is the only way to test each individual item on the boat (overboard bronze skin fittings, bronze valves, rudders, prop shafts, etc). Having tested the individual fittings, the survey report will clearly show if your boat is completely bonded correctly or if there are problems with your bonding. The unit also shows up if there are stray DC or AC currents on the boat. This can cause horrendous damage very quickly.
The kit should be used every 6 months on a boat to ensure the anodes are still working and all the bonding cables are correct.
Where continuous onboard monitoring is required see Onboard Yacht Corrosion Monitor below.
The Analogue Corrosion Test Meter is supplied complete with:
20ft red lead with essential Silver/Silver chloride half cell.
10ft black lead test probe.
This easy to read meter finds all corrosion problems instantly.
Scale needs no interpretation Green=Good Yellow=Bad.

Product	Code
Corrosion test meter and book	CTMB

Yacht Corrosion Meter

Yacht Corrosion Meter:
This onboard, panel mounted meter monitors galvanic voltage and is suitable for boats up to 65ft.
It instantly confirms adequate protection or identifies damaging corrosion voltages.
Simple yellow and green scale monitors the voltage.
Supplied with Silver/Silver Chloride half-cell sensor.
Gives clear indication if anodes need to be replaced and instantly picks up any problems with shore power, earth leaks etc.
The unit permanently monitors your bonding cable, using a Silver / Silver chloride through hull reference point.
This product should be used after the survey system (above) confirms that your bonding system is correctly connected to all your fittings.



Product	Code
Yacht Corrosion Monitor	CYM

Silver / silver anode through hull fitting

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Waterford, CT
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Midwest Marine Supplies
www.midwestmarinesupply.com/
24300 Jefferson Avenue St. Clair Shores, MI 48080
(586) 778-8950

Mathiesen Marine
www.mathiesenmarine.com
3300 Powell Street
Emeryville, CA 94608
(510) 428-1690

Island Water World
http://www.islandwaterworld.com
5 Carribean Locations

2 YEAR GUARANTEE: RETURN TO FACTORY IF IN THE FIRST 2 YEARS YOU HAVE A FAULTY STERLING PRODUCT, THE PRODUCT SHOULD BE RETURNED DIRECT TO STERLING (TO SPEED UP THE HELP PROCESS) AND WE WILL ENDEAVOUR TO REPLACE THE PRODUCT OR REPAIR IT WITHIN 24 HRS AT THE FACTORY. STERLING CANNOT BE HELD RESPONSIBLE FOR THE RETURN CARRIAGE OR ADDED WORK.
LIFE TIME REPAIR POLICY AFTER 2 YEARS IF IT IS UNECONOMIC TO REPAIR THE PRODUCT THEN A SPECIAL DISCOUNT WILL BE OFFERED ON A SIMILAR PRODUCT AT THE FACTORY'S DISCRETION. THIS ONLY APPLIES AT THE FACTORY.

www.sterling-power.com
www.sterling-power-usa.com

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