All effort is made to make this catalogue as accurate as possible. We have an active product line and specifications may change. Refer to our website for the most up to date specifications.

STERLING Power

AMPS
Automotive & Marine advanced Power Systems

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

Designed and developed in England

Follow us
2 years return to factory warranty. Sterling shall endeavour to replace the product or repair it within 5 working days of it being returned. Sterling is not liable for return carriage or additional labour. Lifetime repair policy after 2 years - If it is uneconomical to repair the product then a special discount may be offered on a similar product at Sterling’s discretion. This only occurs if dealt with Sterling directly.
Awarded Premium Product from SAILING TODAY

Automatic Desulphation mode: 7-10 days cycle with anti-stratification program to keep batteries rejuvenated.

Perfect for generator use. Due to its active PFC tolerance of AC input it shall run from crude sine wave forms - typical from generators. Also, % Power Reduction you can set the charger to run at lower power outputs to complement a wider range of generators and low shore power connections.

STANDARDS AND ADVANCED SPECIFICATIONS

UL 1236 SB listed, the highest build standard.
California Energy Commission CEC.

Larger voltage / current requirements?
The Pro Charge Ultra series can be put in series or parallel with other Pro Charge Ultras. This is enabled due to the PCU’s dynamic charging ability.

11 pre-programmed charging profiles for AGM, Gel, sealed/flooded, calcium and lithium (LiFePO4) batteries. We also include a customizable option to allow the user to programme their own profile via the front panel.

More voltage / current requirements?
The Pro Charge Ultra series can be put in series or parallel with other Pro Charge Ultras. This is enabled due to the PCU’s dynamic charging ability.

Multi Lingual. The Pro Charge Ultra now comes with front labels, remote control and instructions in different languages: English, French, German and Spanish.

Perfect for generator use. Due to its active PFC tolerance of AC input it shall run from crude sine wave forms - typical from generators. Also, % Power Reduction you can set the charger to run at lower power outputs to complement a wider range of generators and low shore power connections.

Up to 3 isolated outputs. Each output can carry the full current rating of the charger. However, not all simultaneously - the total current is the charger’s rating.

Cables not included with charger. Refer to page 46 for cables.

Pro Charge Ultra
Award Winning Global Digital Battery Chargers

One of the world’s most efficient chargers. This is courtesy of active power factor correction (PFC 0.99-1). The Pro Charge Ultra is rated at over 90% efficient. PFC is an extremely important feature please refer to Page 55. Non-active PFC chargers are approximately 65% efficient.

World’s Best Seller
This charger’s design is the charger of choice by the world’s largest production boat builders. It is fitted to more new boats than any other charger in the world.

Power Pack / Power Supply.
This charger works effortlessly as a power supply to DC loads to prevent depletion of your battery capacity.

Battery Temperature compensation sensor included.

Automatic Desulphation mode: 7-10 days cycle with anti-stratification program to keep batteries rejuvenated.

Multi Lingual.
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11 pre-programmed charging profiles for AGM, Gel, sealed/flooded, calcium and lithium (LiFePO4) batteries. We also include a customizable option to allow the user to programme their own profile via the front panel.

Models:
12V / 10-60A
24V / 20-30A
36V / 20A
48V / 15A

Remote Control shall operate all models.

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Multi Lingual. The Pro Charge Ultra now comes with front labels, remote control and instructions in different languages: English, French, German and Spanish.
Additional Specification

USA California Energy Commision (CEC) listed: CEC regulation stipulates that the charger is only on when necessary. This reduces AC power consumption and lowers operational costs while maintaining healthy batteries. (default setting is on, CEC can be turned off)

Synchronized Rectification: Mosfet technology, increases overall efficiency over diode based chargers by approximately 8 percentage points.

Automatic Desulphitation / Equalization mode: 7-10 days cycle with anti-stratification program to keep batteries rejuvenated.

Voltage + Current LED display: 2 LED matrix displays. Left side is the voltmeter and the right side is the ammeter.

Performance monitoring LED bar: An LED display to show what rate the charger is operating at.

Redundant safety system: In event of failure, the processor provides another system to shut off device, doubling security. The primary emergency backup is digital, the secondary system is analogue both are totally independent of one other.

High temperature ambient operation rating: Most chargers are only continuously rated at 20 deg C (if even) this unit is rated at continuous operation at 40 deg C ambient.

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.

Thermostatically controlled force draft cooling: To ensure that when the cooling is actually required the noise level is a low as possible for the environmental and power conditions.

The printed circuit boards are conformal coated: For high humidity and salt air operations.

% power reduction: To allow unit to work with restricted power available (available on local control or remote control panel).

Multiple chargers: Multiple chargers can be put in parallel to increase current rating. This is also great for redundancy.

Need pre-fused cable? - more info on page 53

Pro Charge Ultra

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Rating (A)</th>
<th>Weight (KG)</th>
<th>L x W x D (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>10A</td>
<td>2</td>
<td>260 x 215 x 90</td>
<td>PCU1210</td>
</tr>
<tr>
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<td>20A</td>
<td>2</td>
<td>260 x 215 x 90</td>
<td>PCU1220</td>
</tr>
<tr>
<td>12V</td>
<td>30A</td>
<td>2</td>
<td>260 x 215 x 90</td>
<td>PCU1230</td>
</tr>
<tr>
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<td>PCU2420</td>
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<tr>
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<td>3</td>
<td>315 x 215 x 90</td>
<td>PCU2430</td>
</tr>
<tr>
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<td>3</td>
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<td>PCU3620*</td>
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<td>48V *</td>
<td>15A</td>
<td>3</td>
<td>315 x 215 x 90</td>
<td>PCU4815*</td>
</tr>
</tbody>
</table>

Remote w/ 10m cable 0.05 110 x 68 x 20 PCUR

German main label overlay sticker PCUG
French main label overlay sticker PCUF
Spanish main label overlay sticker PCUS

Multi Lingual over lay labels available.

Optional Remote Control

- Charging voltage (V) and charge current (A)
- Multi lingual - English, Spanish, French, German and Italian.
- Charging stage and duration
- Configured Battery Type
- Temperature of the battery
- Error Messages
- 110 x 68 x 20 mm
- 10 meters of cabling
- Remote housing - surface / recess / flush mounted

Battery Chemistry Module

Mixing battery types or voltages

You may have multiple battery types in your DC system (e.g. AGM + open lead acid + Gel) and / or different voltages (12V and 24V) - Please look at our range of Battery Chemistry Modules (BCM). The BCM is designed to simply be added to the output of the PCU to charge different battery type at different voltages. PLEASE TURN TO PAGE 10.
Pro Charge Ultra Lite
Multi stage | Fully Active PFC | Custom Charge Selection | 12V 20-30A | 2 outputs

Global Voltage 80-270VAC 40-70 Hz

This new Pro charge Ultra Lite is aimed at the budget sensitive market. A common question shall be, what are the key differences between the Ultra and the Ultra Lite:

1. The Ultra is larger due to it meeting the ABYC 40 Deg C+ high ambient temperature performance standards.
2. The Lite has an operational range in the 20 Deg C+ (a more common standard for non ABYC), thus, in a smaller body.
3. The Lite displays less information on the front panel but still a lot more than its competitors.
4. Although built to UL standards, including fire resistant plastics etc the Lite is NOT UL certified.
5. The Lite is not CEC certified, the Ultra is.
6. The Lite has temperature compensation, however, unlike the Ultra, the sensor is optional.
7. Cost, the Lite is lower cost
8. Outputs the Lite has a max of 2 outputs suitable for most operations the Ultra has 3.

Truly Global Application and perfect for generators. The Pro Charge Ultra Lite 30A shall work at AC voltages (80-270VAC and 40-70Hz) and DC voltages (130-320V).

Comprehensive 18 LED front panel.
The dual function nature of the LED panel shall also provide voltage information, charging profile statuses and warning statuses.

Battery temperature sensing compensation and remote control (optional). Unlike our competitors this unit has battery temperature sensing and remote control port. The sensor and remote are optional extras. Temp sensor below (TSAY).

Battery daisy chain multiple battery high temperature system shutdown (optional).
Where large numbers of batteries are being used our digital temperature sensor can be linked in a chain to shutdown the battery charger in event of any battery's exceeding 50 deg C.

8 pre-programmed charging profiles for AGM, Gel, sealed / flooded, calcium and lithium (LiFePO4) batteries. We also include a fully customizable option to allow the user to programme their own profile via the front panel.

Night time setting allows the unit to run at ½ power for a fixed time frame so the fan noise is reduced to a minimum.

Larger voltage / current requirements?
The Pro Charge Ultra Lite series can be put in series or parallel with other Pro Charge Ultras. This is possible due to the chargers digital dynamic charging ability.

One of the world’s most efficient chargers. This is courtesy of active power factor correction (PFC 0.99-1). and synchronised rectification. The Pro Charge Ultra Lite is rated at over 90% efficient. PFC is an extremely important feature, please refer to Page 55. Non-active PFC chargers are approximately 65% efficient.

Power Pack / Power Supply.
This charger works effortlessly as a power supply to DC loads to prevent depletion of your battery capacity.

Automatic Desulphation mode: 7-10 days cycle with anti-stratification program to keep batteries rejuvenated.

1/2 current mode. Reduce the charger’s current by 50%.

Perfect for generator use. Due to its active PFC tolerance of AC input it shall run from crude sine wave forms - typical from generators.

Power Reduction you can set the charger to run at lower power outputs to complement a wider range of generators and low shore power connections.

Float Modes and Energy Saving Modes.
You can force this charger into float mode (mid ~13V) intermittently or indefinitely. You can also put the charger into an Energy Saving mode. This mode saves energy by dropping the output voltage down to the voltage of a full battery (~12.8V). This ensures the battery is full and that the charger acts as a power supply when a load is applied to the battery.

Remote Control (Optional) LPCUR
Displays: Voltage / Warnings / Temperatures
Can be used as an independent voltmeter measuring input battery voltage and output battery voltage.
- Force the unit to 1/2 current limit
- Reset both Remote and Charger
- 54mm diameter

Standards
Tested to CE standards
EN61000-3-2
EN61000-3-3
EN55014-1
EN 55014-2
EN60335-2-29
EN ISO 13297
EN 61000-3-3 Class

Outputs DC (V) Rating (A) Weight (Kg) L x W x D mm Code
<table>
<thead>
<tr>
<th></th>
<th>12V</th>
<th>20A</th>
<th>2.0</th>
<th>199 x 158 x 70</th>
<th>LPCU1220</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12V</td>
<td>30A</td>
<td>2.5</td>
<td>199 x 158 x 70</td>
<td>LPCU1230</td>
</tr>
</tbody>
</table>

Remote w / 10m cable 0.05 54mm diameter LPCUR

50 Deg C = 122 Deg F Digital Temp Sensor DAISY CHAIN

60 Deg C = 140 Deg F Digital Temp Sensor DAISY CHAIN

Battery Temp sensor analogue TSAY

Daisy Chain (TSD50/60)

Temp Sensor (TSAY)

Pro Charge Ultra Lite
Pro Charge Ultra Lite 30A
Pro Charge Ultra Lite 20A
Multi stage
Fully Active PFC
Custom Charge Selection
12V 20-30A
2 outputs
Global Voltage 80-270VAC 40-70 Hz

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Battery Temp sensor analogue TSAY

Daisy Chain (TSD50/60)

Temp Sensor (TSAY)
Ultra Portable 7A
Multi stage | Multi Chemistry | Adjustable current | 12V and 6V operation

Sterling has now integrated its high end algorithms for each battery type into a small and portable charger. With the Ultra Portable you get the same great performance from a portable charger as you would with a fixed charger. You can select between 6 different battery chemistries, between 6V and 12V and between 3A | 5A | 7A charging rate. The portable charger can be wall mounted thanks to the wall bracket on the back of the charger.

Multi battery chemistry selection. Similar chargers only have one battery charging profile which fits all. This new portable charger has 6 preset charging profile (see table below) for each battery type, ensuring a fast and safe charging rate.

Automatic or manual start up. Charger shall start charging automatically after 30 seconds. This is incase you have cut the power or have had a power cut and the charger shall resume charging and maintaining the batteries.

The charger shall also remember which charging profile and current rating you have set and shall automatically resort to this setting when you turn the power on.

Power reduction capability: The unit can be set to 3A | 5A | 7A

Can bring 12V batteries that have gone down as low as 4V back up to 12V.

Ultra Portable 6V / 12V | 7A charger

<table>
<thead>
<tr>
<th>Region</th>
<th>V DC</th>
<th>L x W x D (mm)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>British</td>
<td>6V</td>
<td>190 x 115 x 70</td>
<td>0.5</td>
<td>B127</td>
</tr>
<tr>
<td>Europe</td>
<td>6V</td>
<td>190 x 115 x 70</td>
<td>0.5</td>
<td>E127</td>
</tr>
<tr>
<td>USA</td>
<td>6V</td>
<td>190 x 115 x 70</td>
<td>0.5</td>
<td>A127</td>
</tr>
</tbody>
</table>

Input voltage range 190-250V 50 Hz
Power Factor at 230V 0.90
AC current at 230V ~0.6A
Efficiency ~80%
Total Harmonic Distortion 2.4% voltage
Total Harmonic Distortion 2.4% current
Ripple noise (R.M.S.) 14mV
Ground leakage 0.5 mA
Voltmeter accuracy +/- 1%

6 Stage Charging Curve - Charger set to Number 2 (14.4V bulk and 13.8V float).
The charger shall pick up if a load is applied to the battery and re-establish boost mode.

UK + Europe + USA plug models available

12V and 6V operation. The charger senses which voltage the batteries are at and adjust the charging profiles accordingly.

4 Faults on display.
Fault 1 = High output voltage
Fault 2 = High unit temp alarm
Fault 3 = Reverse Polarity
Fault 4 = Open circuit / Batt disconnected

Wall mounting storage bracket (included) on reverse side of the charger. Quick release for portable operation. Measurements denote centre of hole to hole.

Attractive packaging box, ideal for retail.
Portable Battery Chargers (1A-6A)

Each model is available in Euro (Schuko) or British socket, simply select E or B in the SKU.

### Portable Battery Chargers

- **1A 12V**
  - **LED display**, indicates charging status and faults.
  - Fault diagnostic system.
  - Over heat / short-circuit / reverse polarity protection.
  - Low input voltage and over voltage protection.
  - Suitable for use with long term float / storage of battery.
  - Constant 13.9V charge.
  - Automatic 4 stage charging profiles.
  - Adjustable charging current rates.
  - Battery rejuvenation, pulse function (de-sulphation cycle).
  - Insulated charging clips.
  - Suitable for outdoor use in dry conditions only.
  - Battery Ah capacity rating, up to 120Ah:
  - Choice of either British or European plugs
  - Auto start up
  - 6V (and 12V charging) battery charging options

### Charging Options

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Plug</th>
<th>L x W x D mm</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V &amp; 12V</td>
<td>6A</td>
<td>British</td>
<td>180 x 100 x 55</td>
<td>0.7</td>
<td>B126</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
<td>6A</td>
<td>Euro</td>
<td>180 x 100 x 55</td>
<td>0.62</td>
<td>E126</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
<td>5A</td>
<td>British</td>
<td>180 x 100 x 55</td>
<td>0.62</td>
<td>E125</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
<td>5A</td>
<td>Euro</td>
<td>180 x 100 x 55</td>
<td>0.62</td>
<td>E125</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
<td>4A</td>
<td>British</td>
<td>160 x 60 x 45</td>
<td>0.6</td>
<td>B124</td>
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<tr>
<td>6V &amp; 12V</td>
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<td>Euro</td>
<td>160 x 60 x 45</td>
<td>0.6</td>
<td>E124</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
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<td>British</td>
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<tr>
<td>6V &amp; 12V</td>
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<td>Euro</td>
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<td>6V &amp; 12V</td>
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<td>0.35</td>
<td>B121</td>
</tr>
<tr>
<td>6V &amp; 12V</td>
<td>1A</td>
<td>Euro</td>
<td>135 x 50 x 40</td>
<td>0.35</td>
<td>E121</td>
</tr>
</tbody>
</table>
Defective battery identification. The charger detects if the battery is beyond repair.

Universal AC Input (100V to 240V 47Hz-64Hz): can be used anywhere in the world, truly global charging.

50% power reduction mode: For small batteries, under 30Ah.

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.

Pulse absorption and float charge. After battery is charged the charger can still provide 5A to run on board lighting / appliances. Works as a small power supply.

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.

Battery chemistry selection. Suitable for all types of lead acid batteries: Wet, GEL, AGM, Calcium.

Easy to select battery type voltages x 2 for 24V unit.

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

Open lead acid
14.8V charge
Float 13.5V

Calcium
15.1V charge
Float 13.5V

Polycarbonate casting.
Water resistant IP45 waterproof.

Simple 3 touch screen selections with intuitive iconic LED indications.

Global Smart portable battery charger

12V-5A / 24V-2.5A

Desulphation / Equalization mode. The Global Smart shall attempt to pulse the sulphate plates to clean them. Repairs can only happen if recoverable.

50% power reduction mode:
For small batteries, under 30Ah.

Global Smart portable battery charger

<table>
<thead>
<tr>
<th>Plug type</th>
<th>Input (VAC)</th>
<th>Output (VDC)</th>
<th>Current (A)</th>
<th>Weight Kg</th>
<th>Code</th>
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<tbody>
<tr>
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<td>5A</td>
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<td>GS125B</td>
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<td>Euro</td>
<td>110-230V</td>
<td>12V</td>
<td>5A</td>
<td>0.4</td>
<td>GS125E</td>
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<tr>
<td>USA</td>
<td>110-230V</td>
<td>12V</td>
<td>5A</td>
<td>0.4</td>
<td>GS125A</td>
</tr>
<tr>
<td>British</td>
<td>110-230V</td>
<td>24V</td>
<td>2.5A</td>
<td>0.4</td>
<td>GS243B</td>
</tr>
<tr>
<td>Euro</td>
<td>110-230V</td>
<td>24V</td>
<td>2.5A</td>
<td>0.4</td>
<td>GS243E</td>
</tr>
<tr>
<td>USA</td>
<td>110-230V</td>
<td>24V</td>
<td>2.5A</td>
<td>0.4</td>
<td>GS243A</td>
</tr>
</tbody>
</table>

Battery chemistry selection - worldwide voltage operation

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

Open lead acid
14.8V charge
Float 13.5V

Calcium
15.1V charge
Float 13.5V

Protections:
- Overload protection
- Short circuit
- Over temperature
- Reverse polarity
- Thermal Control - regulates in hot conditions
- 50% power reduction for batteries under 30Ah
- Cold weather charging - higher voltage charge.
- No Connection Spark - charger only on when connected

Approvals: EN60335 EN55014

www.sterling-power.com

Select

Repair / flash scrap
Ready
Battery Type
Pb
Sealed lead acid
Pb
Open lead acid
Ca
Calcium

Global Smart portable battery charger

12V-5A / 24V-2.5A

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.
The Battery Chemistry Module (BCM) is a retro fit device designed to be installed on the output of a current limiting multi output battery charger to allow the battery charger to have independent chemistry selection on each output. More and more so, individuals are having different battery styles/chemistry and different voltage scales (12V and/or 24V) all within their DC system. Due to this quagmire, the BCM is the solution to allow one battery charger to charge different battery chemistries at different voltage scales and at their correct charging profile. So, the BCM can essentially turn a very simple battery charger into a multi output, multi chemistry advanced battery charger with other inherent advantages.

**Simple to install.** Simply connect the input of the BCM to an output of a current limiting battery charger and connect the output of the BCM to the battery bank.

**Ideal set up would be a 12V AGM house bank and a 24V deep cycle bow thruster bank. From one charger you can charge both banks at their correct voltage scale and correct charging profile.**

**Remote voltage compensation.** To do away with voltage drop across long cables there is a feature which allows the charger to compensate for a voltage drop up to about 1 volt.

**Do not install on a charger where the current exceeds the BCM’s rating.**

**Battery temperature compensation and high battery temperature trip.**

**8 selectable charging profiles.** AGM, Gel, sealed lead acid, flooded lead acid and lithium. There is also a desulphation mode.

**Most cost effective method for multi chemistry multi output battery charging on the market.**

**Converts a single output charger into a multi output charger using multiple units.**

**Converts a multi output charger into a multi chemistry multi output charger.**

**4 Models:**
- 12V-12V
- 12V-24V
- 24V-24V
- 12V-24V

**Temperature Sensor**
- 1 x battery analogue temperature sensor

**Optional Remote Control**
- cut hole: 54 mm
- total diameter: 68 mm
- thread depth: 44 mm

**Battery Chemistry Module or a Battery to Battery Charger?**
We are frequently asked this question.

For an in depth reason to choose the BCM over the Battery to Battery Charger. We recommend that you refer to our FAQ page. Here we shall discuss the main differences, essentially the benefits of current limiting in the versatility of the battery to battery charger. The BCM is a more cost effective method when connected to a battery charger.
**Typical Wiring Examples**

**Long cable runs**

Cable length = voltage drop (1.0V for example)

Voltage increased to:
- 14.1V - 15.1V (12V)
- 28.2V - 30.2V (24V)

### Battery Chemistry Module

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCM1260</td>
<td>12V-12V up to 60A Max 60A 12V charger</td>
</tr>
<tr>
<td>BCM2430</td>
<td>24V-24V up to 30A Max 30A 24V charger</td>
</tr>
<tr>
<td>BCM1224</td>
<td>12V-24V 10A (at 24V) Current limiting any 12V charger</td>
</tr>
<tr>
<td>TSD05</td>
<td>50 deg C = 122 deg F Digital temp sensor</td>
</tr>
<tr>
<td>TSD60</td>
<td>60 deg C = 140 deg F Digital temp sensor</td>
</tr>
<tr>
<td>TSD70</td>
<td>70 deg C = 158 deg F Digital temp sensor</td>
</tr>
<tr>
<td>TSD80</td>
<td>80 deg C = 176 deg F Digital temp sensor</td>
</tr>
<tr>
<td>BCMR</td>
<td>Battery Chemistry remote control plus 10m cable</td>
</tr>
</tbody>
</table>
Pro Charge Ultra **AQUANAUTIC**

**Waterproof battery charger**

- 12V | 24V | 36V | 48V models.
- 10A - 40A.
- 1 - 4 fully isolated outputs.
- *Independent charging profile for each output - unique feature.*
- Active PFC - Global input 80-270VAC.
- Synchronised rectification for higher temperature operation.
- Pre-wired and pre-fused of 2m cable.

**Active Power Factor Correction** (PFC 0.99-1). The Aquanautic is rated at over 86% efficient. Read page 51 on the importance of PFC.

**Unique labyrinth gland sealing system** ensuring a dual sealed system.

IP67 insulation for the vulnerable electronics system section. IP56 well protected waterproof fan cooling system.

The dual seal ensures a light weight and compact footprint. Under extreme water saturation, the fan can be replaced with ease.

**Battery Temperature** compensation available as an optional extra. This also includes external interlock switch.

**Multi Lingual.** The Aquanautic comes with front labels and instructions in different languages: English, French, German and Spanish.

9 pre-programmed charging profiles for AGM, Gel, sealed/flooded and calcium batteries LiFePO4. We also include a customizable option to allow the user to programme their own profile via the front panel. This includes voltages and time based features.

Optional Remote Control (PCUAR)
- Charging voltage (V) and charge current (A).
- Voltage displays as individual battery banks or totalled if multi voltage banks used i.e. one bank 12V and one bank 24V (must be connected in correct sequence to achieve this).
- Voltage readings can be used with charger not connected to AC source to assist in battery monitoring.
- Battery charger sequence
- Multi coloured screen to depict faults or normal running
- Force select options available from remote control
- Charging stage and duration
- Configured battery type display
- Temperature of the charger
- Temperature of the battery
- Error Messages
  - 110 x 68 x 20 mm
  - 10 meters of cabling
  - Remote housing - surface / recess / flush mounted

**Comprehensive 22 LED front panel.** The user is provided with a voltmeter. The panel also includes charging profile statuses and warning statuses.

**Power Pack / Power Supply.** This charger works effortlessly as a power supply to DC loads to prevent depletion of your battery capacity.

**Perfect for generator use.** Due to its active PFC tolerance of AC input it shall run from crude sine wave forms - typical from generators. Also, % Power Reduction you can set the charger to run at lower power outputs to complement a wider range of generators and low shore power connections.

**Larger voltage / current requirements?** The Pro Charge Ultra series can be put in series or parallel with other Pro Charge Ultras. This is enabled by the charger’s dynamic charging ability.

**Truly Global Charger.** The Aquanautic shall work at AC voltages (80-270VAC and 40-70Hz) and DC voltages (130-320V) input. Perfect for generators.

**Automatic Desulphation mode:** 7-10 days cycle with anti-stratification program to keep batteries rejuvenated.

**Temperature of the battery** shall work at AC voltages (80-270VAC and 40-70Hz) and DC voltages (130-320V) input. Perfect for generators.

**9 pre-programmed** charging profiles for AGM, Gel, sealed/flooded and calcium batteries LiFePO4. We also include a customizable option to allow the user to programme their own profile via the front panel. This includes voltages and time based features.

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- **Unique labyrinth gland sealing system** ensuring a dual sealed system.
- IP67 insulation for the vulnerable electronics system section. IP56 well protected waterproof fan cooling system.
- The dual seal ensures a light weight and compact footprint. Under extreme water saturation, the fan can be replaced with ease.
- **Battery Temperature** compensation available as an optional extra. This also includes external interlock switch.
- **Multi Lingual.** The Aquanautic comes with front labels and instructions in different languages: English, French, German and Spanish.
- 9 pre-programmed charging profiles for AGM, Gel, sealed/flooded and calcium batteries LiFePO4. We also include a customizable option to allow the user to programme their own profile via the front panel. This includes voltages and time based features.

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- Charging stage and duration
- Configured battery type display
- Temperature of the charger
- Temperature of the battery
- Error Messages
  - 110 x 68 x 20 mm
  - 10 meters of cabling
  - Remote housing - surface / recess / flush mounted

**Truly Global Charger.** The Aquanautic shall work at AC voltages (80-270VAC and 40-70Hz) and DC voltages (130-320V) input. Perfect for generators.

**Comprehensive 22 LED front panel.** The user is provided with a voltmeter. The panel also includes charging profile statuses and warning statuses.

**Power Pack / Power Supply.** This charger works effortlessly as a power supply to DC loads to prevent depletion of your battery capacity.

**Perfect for generator use.** Due to its active PFC tolerance of AC input it shall run from crude sine wave forms - typical from generators. Also, % Power Reduction you can set the charger to run at lower power outputs to complement a wider range of generators and low shore power connections.

**Larger voltage / current requirements?** The Pro Charge Ultra series can be put in series or parallel with other Pro Charge Ultras. This is enabled by the charger’s dynamic charging ability.
Multi Chemistry, Multi output.
This bespoke feature of the Aquanautic allows each output to have their own unique charging profile. This is advantageous if you have different battery types in one system. Using the bass boat example below, you could have a sealed lead acid starting battery and AGM trolling motor batteries. With this Aquanautic you can charge BOTH the AGM and the sealed lead acid battery at their correct charging profile, simultaneously. If you so needed you even could charge 4 different battery chemistries across the 4 outputs.

Charging groups and battery balancing.
You can set the charger to charge in voltage groups. I.e. if you have to charge a 36V bank and a 12V bank you can programme the charger to attribute the correct charging profile to the correct voltage group bank. It can determine which cell within the bank requires more current and which requires less and charges them appropriately.

12V battery charging
single output

36V trolling motor and 12V starter

12V / 40A model, all other units pro rata
Input voltage range 80-270V 40-70 Hz
Power Factor at 230V 0.976
Active power factor correction
Efficiency 94.4%
Full load current (110/230V) 9.8/6.6A
Total Harmonic Distortion 2.4% voltage
Total Harmonic Distortion 2.4% current
Ripple noise (rms ) 14mV
Ground leakage 0.5 mA
Generator / mains power (watts)
12V  20A approx 350W
12V  30A approx 500W
12V  40A approx 600W

<table>
<thead>
<tr>
<th>Model</th>
<th>Current (12V)</th>
<th>Outputs</th>
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<tbody>
<tr>
<td>12V 1 output</td>
<td>10A</td>
<td>1</td>
<td>PCUA101</td>
</tr>
<tr>
<td>12V / 24V 2 output</td>
<td>10A</td>
<td>2</td>
<td>PCUA102</td>
</tr>
<tr>
<td>12V 1 output</td>
<td>25A</td>
<td>1</td>
<td>PCUA251</td>
</tr>
<tr>
<td>12V / 24V 2 output</td>
<td>25A</td>
<td>2</td>
<td>PCUA252</td>
</tr>
<tr>
<td>12V / 24V / 36V 3 output</td>
<td>25A</td>
<td>3</td>
<td>PCUA253</td>
</tr>
<tr>
<td>12V 1 output</td>
<td>40A</td>
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<td>PCUA401</td>
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<tr>
<td>12V / 24V 2 output</td>
<td>40A</td>
<td>2</td>
<td>PCUA402</td>
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<tr>
<td>12V / 24V / 36V 3 output</td>
<td>40A</td>
<td>3</td>
<td>PCUA403</td>
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<tr>
<td>12V / 24V / 36V / 48V 4 output</td>
<td>40A</td>
<td>4</td>
<td>PCUA404</td>
</tr>
</tbody>
</table>

Remote Control
PCUAR

Recommended chargers for the 24V setup:
PCUA102
PCUA252
PCUA402

Recommended chargers for this setup:
PCUA101
PCUA251
PCUA401

This wiring example uses the 4 output (48V) charger PCUA404. Three 12V outputs in series across the 36V battery providing a total of 10A at 36V. Also, you have a 12V output providing 10A to the starter battery.

24V or 48V floor cleaner batteries (example).
The Waterproof Aquanautic battery charger is a fully sealed, fully waterproof and fully dust ingress/proof built to IP67 marine grade battery charger. The charger features active power factor correction, this allows for global AC input (90VAC-270VAC) and improved efficiency.

- Power Factor Corrected (active) 0.99-1 (PFC)
- 90VAC-270VAC input (47-70Hz).
- Extruded aluminum housing.
- Pre-fused and pre-wired with 1.5 m cable.
- Waterproof built to IP67 standard.
- Adaptive charging, ensuring maximum charge in the batteries.
- LED power and charge indicators.
- Pre-fused and gold plated terminals.
- Up to 3 isolated outputs.
- Preset charging profiles AGM, Gel, flooded lead acid.
- Available in 8A / 12A / 20A
- Available in 12V / 24V / 36V
- Dynamic thermal output control, reduces power rather than over heats.

The Pro Sport 5 and 5/5
A range of battery chargers designed to IP68 standard. Available in 5A and 10A models. 12V and 24V.

- 12V 5A and 24V 5A (10A at 12V - 2 output)
- Moulded plastic case.
- Ignition Protected
- Epoxy filled, IP68 proofing.
- Adaptive charging, ensuring maximum charge in the batteries.
- LED power and charge indicators.
- Pre-fused and pre-wired with 1.5 m cable.
- Up to 3 fully isolated outputs.
- Dynamic thermal output control, reduces power rather than over heats.
Regenerative Braking - Introduction to the problem and the solution.

Voltage variations associated with vehicle regenerative braking / smart alternator Systems (Energy Recovery System) and what a Sterling Battery to Battery Charge does to rectify this problem.

What is Smart Alternator / Regenerative Braking?
The initiative behind the introduction of smart alternators / regenerative braking is to lower CO$_2$ emissions and to improve miles per gallon / KM per litre for EU regulations. These smart alternators are installed on modern European Vehicles (Euro 5, Euro 6 + and newer engine models).
The object of this new system is to utilise a vehicles wasted kinetic energy during braking / deceleration cycles experienced in every day motoring and rapidly convert as much of that energy (which is usually wasted as braking heat) into useful electricity and store this energy in the starter battery. Then, during acceleration and cruising release this energy back into the vehicle's running system as ‘free electrical energy’ thus reducing the time where a alternator loads the main engine. This increases MPG/KPL and lowers CO$_2$ emissions.

However, in order for this system to be effective, the starter battery must have ‘free space’ to boost the energy into the battery, this requires the battery to be about 20% depleted (low enough to allow more power to be boosted into it but not too low as to prevent the engine from restarting when switched off). To replenish this ‘free space’, during deceleration or braking events, the voltage on the alternator shoots up to approximately 16V+. This higher voltage fast charges the starter battery to replenish its capacity. As you are using the inertia of the vehicle to charge the battery, rather than fuel, it is seen as ‘free energy’. Then the voltage drops to about 12.4V to allow the free energy to be consumed by the vehicle allowing the battery to deplete itself by about 20% ready for the next speed reduction and repeat and so forth. Albeit an improvement in terms of emissions, there are knock on effects regarding the auxiliary charging systems on board commercial vehicles, read on:

Problems with Smart Alternator / Regenerative Braking
The system requires a 20% empty starter battery for the system to work. It needs the space to ‘dump’ the fast energy build up during braking. This is in direct conflict with the auxiliary charging system requirements, why?
1) No charge going into the batteries during the 12.2-12.4V phase (which is totally by primary system design). Therefore, if a simple relay charging system was used, the auxiliary system would be charged during this time frame, in fact it can back feed any charge it has into the vehicle system. This will certainly be a problem if you require a charged auxiliary battery during travel or at location to location.
2) Very high battery charge rate during vehicle deceleration / braking due to alternator high voltage. This is relatively problem free for the starter battery as its relatively full. However, a large empty auxiliary bank will experience very high currents at high voltages (much higher than their recommended level) which would be detrimental to the battery (especially sealed, AGM and Gel) leading to premature destruction.

Problem with using voltage sensitive/controlled relays?
1) Most VSR / VCRs have 2-3 minute time delays before activating.
2) Even if the relay engages the massive voltage swings would prevent the second battery from getting any serious charge when on low voltage and would certainly damage many batteries when at high voltage due to the voltage and massive current in rushes.

The Solution Sterling Batt. to Batt. chargers 20-180A
Sterling’s Battery to Battery Charger: The battery to battery charger range is designed to be connected between the starter battery and the auxiliary system. This unit will increase the vehicle’s voltage to the auxiliary battery when it is low and reduce the vehicles voltage to the auxiliary battery when it is high. It will also NOT permit high current inrush beyond the rating of the product (even under high demand loads) and so delivers the auxiliary battery system the correct voltage for different battery types (programmable) regardless of the main system voltage swings, thus, protecting the auxiliary batteries from unnecessary damage. It ensures a constant, safer and much faster charge from the system.

It should also be noted that even on older vehicles or vehicles without smart alternators / Regenerative braking system, the Battery to Battery charger will charge auxiliary batteries much faster than conventional non active products such as relays. This product also has the ability to compensate for cable voltage drops over distance which will still result in up to a 10 times + faster charge rate.
Wildside charging - MUST READ FOR CARAVAN USERS. Massively improved charging by over 700% and get much more stored power. Fridge operation restored, giving you the freedom to roam the world.

The Problem

The electrical requirements onboard caravans have increased in the modern world (laptops / tablets / phones/microwaves/hairdryers etc.). When at campsites this is no problem thanks to AC hookup. However, if touring on your feet and don't wish to be limited by campsites, then this is the product for you.

The existing charging onboard caravans while moving - charging from your main vehicle - is terrible. This is because the onboard charging systems have not modernised by keeping up with onboard electrical demands NOR by dealing with the contemporary peculiarities associated with Euro 5 / Euro 6 engines. A prime example being that some fridges do not work whilst towing your caravan. Also, your battery will not receive any charge. This is because the towing vehicle alternator’s voltage is dropping below the enabling threshold of the fridge and below that of the batteries. Refer to page 15 for Euro 6 / regenerative braking information. We use a van in the test - any modern SUV or car could have also been used.

These problems are unnecessary when you consider that modern vehicles have such large alternators and surplus power - much more than their predecessors. Utilizing the alternator’s potential to actually charge your caravan battery fast and fully + running your fridge could free you from constant visits to camp sites when the Wildside option could be enjoyed more and at much lower costs.

A full caravan battery means freedom to enjoy the Wildside experience. Increasing battery banks sizes extends this experience with the knowledge that during your next drive your battery will fully charge from your vehicle. This is something caravanners always assume their system was doing, yet it simply was not.

The Solution

The solution needs to overcome the following problems:

1) Deal with the massive voltage drop down the cables / plugs between the car and the caravan by boosting the low voltage to the correct voltage expected to charge the batteries. Also, reducing the voltage during the voltage highs associated with the new euro 5-6+ engines to prevent damage to equipment.

2) Utilize as much of the standard plug and wiring system as possible to avoid changing the basic system - for the sake of ease of installation.

3) Enable the fridge to operate ( 12V aspect ), in transit, or remain ( optional setting ) in operation if not connected to 230V.

4) Charge the onboard batteries fast using a 4 stage charging profile + 9 battery type programmes available. This ensures the battery is fully charged. Plus, a custom set option allowing the unit to be set up to any customer’s personal choice. This ensures your electric caravan mover works when you arrive at your destination.

5) Present the owner with a financial ‘payback’ from the product’s installation. Campsite savings + battery longevity.

6) Supply easy option modes to cover DC fridges, touring or site modes.

7) Add extra safety features, such as: Low battery fridge disconnect to allow lights to work after fridge has been disconnected in the event of battery discharge.

1) A clean and simple install in the main charging cable via the conventional socket. The conventional socket is rated to about 20A, however, it is more like 2-3A. The addition of the 20A battery to battery charger (BBC1220) will dramatically increase that charge rate and shall also compensate for all the problems associated with euro 5-6+ engines. Likewise, if you don’t have Euro 5-6+ you will still enjoy at least a 500-700% faster charge rate and double your useful battery storage capacity. This constant current charger allows the battery plate to stack much cleaner and last longer.

Wildside mode (AC 230V not available) allows the 12V aspect of the fridge to be engaged directly to the battery when the car has been stopped. This allows the fridge to run directly from the caravan battery on 12V. This obviously increases the battery consumption, however, the battery should be good for a day or so depending on the efficiency of the fridge. A larger battery can be installed in the caravan but watch chassis weight restrictions. A low voltage battery trip will disengage the fridge when the caravan battery is low, at approx. 11V.

Camp site mode (AC 230VAC available), this only allows the 12V fridge to operate during transit and will automatically isolate the fridge from the caravan battery when the journey is completed. The fridge should then be connected to the 230V campsite power, to which is can receive its power from.

By increasing your battery capacity and charging rate you can then start looking at inverters. These enable use of phone / tablet charging, microwaves, hair dryers, hair straighteners, tools etc. Please look at our new Pro Combi S+ 1600 pure sine wave inverter / charger. Ideal for adding that next level of comfort to your caravan experience.

About the Product

Battery to Battery Charger

**Pro Batt Ultra - caravan spec.**

**Specification:**
- 20A DC to DC Charger.
- 35A fridge relay.
- Automatic operation.
- 16 LED information and alarm panel.
- Optional battery temperature compensation.
- Remote mode operation select.
- Thermostatically controlled fan cooling.

- High grade fire retardant plastic case.
- Refer to Battery to Battery Charger for additional info.

For even larger battery banks and more powerful charging solutions see:
- Option 2: Advanced charging - adding extra cables, plug and socket arrangement - up to 120A. Ideal for Wildside camping with larger battery banks and Euro 5/6+ vehicles.

<table>
<thead>
<tr>
<th>DC</th>
<th>Dimensions HxWxD</th>
<th>Weight</th>
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</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>180mm x 120mm x 67mm</td>
<td>1 Kg</td>
<td>BBC1220</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td></td>
<td></td>
<td>TSAY</td>
</tr>
</tbody>
</table>

There are videos about this on our YouTube channel: https://www.youtube.com/watch?v=EEhmWWd6Evs

Option 1: Advanced charging using your standard plug and socket arrangement. Up to 20A ideal for Euro 5/6+ vehicles and standard vehicles.

Battery to Battery charger up to 20A ideal for 60A - 100Ah battery, fits in line with the standard system.
What is Smart Alternator/ Regenerative Braking?
The initiative behind the introduction of smart alternators / regenerative braking is to lower CO\textsubscript{2} emissions and to improve miles per gallon / KM per litre for EU regulations. These smart alternators are installed on modern European Vehicles (Euro 5 / Euro 6 + and newer engine models).
The object of this new system is to utilise a vehicle’s wasted kinetic energy during braking/deceleration cycles experienced in every day motoring and rapidly convert as much of that energy (which is usually wasted as braking heat) into useful electricity and store this energy in the starter battery. Then, during acceleration and cruising, release this energy back into the vehicle’s running system as “free electrical energy”. This reduces the time where an alternator loads the main engine. This increases mpg/kpl and lowers CO\textsubscript{2} emissions.

However, in order for this system to be effective the starter battery must have ‘free space’ to boost this energy into. Therefore, the alternator needs to engage under slow down / braking conditions and then only if the starter battery requires it. This requires the battery to be about 20% depleted (low enough to allow more power to be boosted into it but not too low as to prevent the engine from restarting when switched off). To replenish this ‘free space’, during deceleration or braking events, the voltage on the alternator shoots up to approximately 15V+. This higher voltage fast charges the starter battery to replenish its capacity. As you are using the inertia of the vehicle to charge the battery, rather than fuel, it is seen as ‘free energy’. Then the voltage drops to about 12.4V to allow the free energy to be consumed by the vehicle allowing the battery to deplete itself by about 20% ready for the next speed reduction and so on and so forth. Albeit an improvement in terms of emissions, there are knock on effects regarding the auxiliary charging systems on board campervans, read on:

Problems w/ Smart Alternator/ Regenerative Braking / Euro 6 +?
The problems below are made worse when you consider that the vehicles are now coming equipped with the largest alternators ever in the history of campervans. This is to facility the large dump current generated during slow down, however, that extra performance is not directed to where you really want and need it (the auxiliary battery bank). This potential power is totally wasted and your modern camper battery charging performance, which was poor to start with, is actually the worst ever - ironic to say the least.
The system requires a 20% empty starter battery for the system to work. It needs the space to “dump” the fast energy built up during braking. This is in conflict with the auxiliary charging system, why?:
1) No charge going into the batteries during the 12.2V - 12.6V phase (which is totally by design). Therefore, an auxiliary system would not be charged during this time frame. This shall certainly be a problem if you require a charged auxiliary battery during:
   A) Simple travel. B) If you travel from location to location. C) If you are stationary and you simply want to top up the auxiliary battery by starting the engine and leaving the engine running.
2) High alternator charge rate during vehicle deceleration / braking. This is relatively problem free for the starter battery as it is relatively full. However, a large flat auxiliary bank could experience high currints at high voltages which could be detrimental to the battery (especially sealed, AGM and Gel) leading to premature destruction.
3) A 12V fridge only operates from the 12V system when there is ~14V (when a traditional engine was running), however, as the voltage fluctuates on modern engines the fridge does not come on and stay on, thus, does not function correctly.

Problem with using voltage sensitive / controlled relays?
1) Most VSR / VCRs have 2-3 minute time delays before activating.
2) Relays operating within set voltage e.g. 13V-15V. If the alternator’s voltage is below 13V or above 15V then the relay will not engage.
3) Even if the relay engages, massive current in rushes would damage batteries and the relays and the very poor cabling on a lot of these vehicles.

Solution
Sterling’s Battery to Battery Charger: The battery to battery charger range is designed to be connected between the starter battery and the auxiliary system. This unit will increase the vehicle’s voltage to the auxiliary battery when it is low and reduce the vehicle’s voltage to the auxiliary battery when it is high. This allows a constant voltage within 14-15V onto the auxiliary battery that allows the fridge (for example) to run constantly whether you are stationary with the engine running, accelerating, constant speed or decelerating. It will also NOT permit high current inrush beyond the rating of the product and so delivers the auxiliary battery system the correct voltage for different battery types (programmable). This is regardless of the main system voltage swings. This protects the auxiliary batteries from unnecessary damage. It ensures a constant, safer and much faster charge from the system.

It should also be noted that even on older vehicles or vehicles without smart alternators / Regen. Braking system the Battery to Battery charger will charge auxiliary batteries much faster than conventional non active products such as relays. This product, also, has the ability to compensate for cable voltage drops over distance which will still result in up to a 10 times faster charge rate.
Sterling’s range of Battery to Battery Chargers (B2Bs) has grown significantly over the past few years. Offering a product range in this market un surpassed by anyone in both power and flexibility. This is in an effort to supplement the ever growing demand from the commercial vehicle, recreational vehicle and marine industries. The B2Bs have become extremely popular as they fast charge batteries as you cruise along without the need for complex wiring, touching your alternator, voiding the alternator’s warranty and tampering with the electronic control units (ECUs). You can provide the onboard batteries with a fast 4 stage charging profile with a very simple and speedy installation. All of the benefits of advanced charging without any of the drawbacks. Simply connect the B2B between the battery being charged and the battery you wish to charge.

3 activation modes:

1) Automatic - Default, operates on input voltage (13.3V / 26.6V on) and complements regenerative braking with low voltage timer. No ignition feed required.

2) Ignition feed with timer. As above, however, requires a live ignition feed to operate. Input voltage figures and timings, as above.

3) Ignition feed without timer. As above, however, the timer does not kick in, so it can potentially stay on indefinitely provided input voltage stays above a certain low threshold.

Output charging at 12V, 24V, 36V and 48V. Input voltages at 12V and 24V. Up to 800W rating. Much larger model up to 3000W coming soon.

Current is NOT taken from the input battery and given to the output battery except during the low voltage timer for regenerative braking mode. This time frame can be increased in length or brought down to 0 seconds.

Safety features:
- 100% fire proof plastic box
- no screws to corrode
- thermal power reduction
- multi stage fan cooling

Dynamic thermal charging, the charging voltage fluctuates based on the temperature of the sensor (included ->).

1 x temperature sensor (TSAY) included in all units except the BB1215 where is can be purchased as a optional extra.

The default mode, which is Automatic Regenerative Braking Friendly, does not require an ignition feed to operate. It works on input voltage and timing algorithms (These values can be customised on the unit). This is ideal for most setups as ignition feeds are getting increasingly hard to find on modern vehicles, this new unit is therefore simple to install.

Very simple to install. No Electronic Control Unit (ECU) issues. No complex wiring. No Warranty issues. Fully prepared for smart alternators (Regenerative braking).

4 stage battery charging. The B2B charges batteries between 5-20 times faster than a stand alone alternator.

B2B turns on at 13.6V and turns off at 13.3V (x2 for 24V). Thus, does not drain input battery. Regenerative braking mode shall allow the input voltage to drop to 12.2V (x2 for 24V).

Remote Control (Optional)

Displays: Voltage / Warnings / Temperatures. Can be used as an independent voltmeter measuring input battery voltage and output battery voltage.

Can remotely modify the Batt. the Batt. Charger: - Force the unit to float - Force the unit to 1/2 current limit - Force the unit to standby - Force the unit off - Force the unit to Night Mode - Reset both Remote and Charger 54mm diameter

Remote w/ 10m cable

German, French, Spanish main label overlay sticker

### DC V (in) DC V (out) Current (A) Weight (Kg) L x W x D mm Code

<table>
<thead>
<tr>
<th>DC V</th>
<th>DC V</th>
<th>Current (A)</th>
<th>Weight (Kg)</th>
<th>L x W x D mm</th>
<th>Code</th>
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</tr>
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</table>

9 preset battery chemistry options including AGM, LiFePO4, Gel, flooded and sealed lead acid.

Customizable profile - choose your own charging profile on the front panel.

Boost / Reduce Charging. The B2Bs ensure batteries get the correct charging profile irrespective of high or low input voltages.

Night time setting allows the unit to run at ½ power so the fan noise is kept down.
Waterproof Battery to Battery Charger
12V 60A-120A

Waterproof (built to) IP66 models. These units have the benefit of being epoxy potted so that the charger is sealed off from water and dirt ingress. The cooling fan is not sealed and is rated at IP55, the fan is designed to be easily replaced in the event of major immersion.

The default mode, which is Automatic Regenerative Braking Friendly, does not require an ignition feed to operate. It works on input voltage and timing algorithms (These values can be customised on the unit). This is ideal for most setups as ignition feeds are getting increasingly less common and it makes this unit very simple to install.

9 preset battery chemistry options including AGM, LiFePO₄, Gel, flooded and sealed lead acid.

60A and 120A models. Only in 12V. Features are similar to that of the non-waterproof models.

Regenerative braking and manual override ability.

Simple Wiring Diagram. Illustration to show the most common B2B setup. Whether, for charging bow thrusters banks on boats or for charging domestic banks on RVs or commercial vehicles.

120A

12V Alternator direct output power Linearisation Device (ALD)

Total alternator control. Certain applications require current and voltage control directly from the alternator’s output - lithium battery charging, for example. This is not straightforward. The problem is that an alternator produces a half wave, non filtered wave form. This is a poor quality output and could not be used directly into any normal equipment without using a battery as a buffer. Failure to do this will destroy the equipment. In addition, lithium batteries require a shut off system so at any time the alternator could become unloaded fast which would destroy the alternator. This is prevented under normal use as an alternator is always connected to a battery. The battery absorbs all the spikes to make a relatively smooth linear power supply. The battery is crucial to achieving this smoothness and also allows the alternator to be unloaded without destroying the alternator.

Numerous benefits over a normal 12V starter battery? The ALD is smaller and lighter than a normal starting battery. Batteries also need maintaining, they gas, they may over charge and they do not like being transported - the ALD does not suffer from any of these issues. The ALD also acts as a very prominent alternator protection device, sheltering your alternator from any harmful back spikes.
120A - 240A 12V to 12V battery to battery chargers. For those with large alternators and large demands.

3 activation modes:
1) **Automatic** - Default, operates on input voltage (13.3V / 26.6V on) and complements regenerative braking with low voltage timer. No ignition feed required.
2) **Ignition feed with timer**. As above, however, requires a live ignition feed to operate. Input voltage figures and timings, as above.
3) **Ignition feed without timer**. As above, however, the timer does not kick in, so it can potentially stay on indefinitely provided input voltage stays above a certain low threshold.

Very simple to install. No Electronic Control Unit (ECU) issues. No complex wiring. No Warranty issues. Fully prepared for smart alternators (Regenerative braking).

Dynamic thermal charging, the charging voltage fluctuates based on the temperature of the sensor (included ->).

Adjustable current limit. The current limit can be reduced to 50%.

Safety features:
- 100% fire proof plastic box
- no screws to corrode
- thermal power reduction
- multi stage fan cooling

1 x temperature sensor (TSAY) included in all units except the BB1220 where is can be purchased as a optional extra.

4 stage battery charging. The B2B charges batteries between 5-20 times faster than a stand alone alternator.

The default mode, which is Automatic Regenerative Braking Friendly, does not require an ignition feed to operate. It works on input voltage and timing algorithms (These values can be customised on the unit). This is ideal for most setups as ignition feeds are getting increasingly hard to find on modern vehicles, this new unit is therefore simple to install.

Current is NOT taken from the input battery and given to the output battery except during the low voltage timer for regenerative braking mode. This time frame can be increased in length or brought down to 0 seconds.

9 preset battery chemistry options including AGM, LiFePO4, Gel, flooded and sealed lead acid.

Customizable profile - choose your own charging profile on the front panel.

B2B turns on at 13.6V and turns off at 13.3V. Thus, does not drain input battery. Regenerative braking mode shall allow the input voltage to drop to 12.2V (x2 for 24V).

Boost / Reduce Charging. The B2Bs ensure batteries get the correct charging profile irrespective of high or low input voltages.

Night time setting allows the unit to run at ½ power so the fan noise is kept down.

Remote Control (Optional)
Displays: Voltage / Warnings / Temperatures.
Can be used as an independent voltmeter measuring input battery voltage and output battery voltage.
Can remotely modify the Batt. the Batt. Charger:
- Force the unit to float
- Force the unit to 1/2 current limit
- Force the unit to standby
- Force the unit off
- Force the unit to Night Mode
- Reset both Remote and Charger
54mm diameter

<table>
<thead>
<tr>
<th>DC V (in)</th>
<th>DC V (out)</th>
<th>Current (A)</th>
<th>Weight (Kg)</th>
<th>L x W x D mm</th>
<th>Code</th>
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</thead>
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<td>12V</td>
<td>120A input</td>
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<td>250 x 245 x 95</td>
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<td>12V</td>
<td>180A input</td>
<td>4</td>
<td>320 x 245 x 95</td>
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<td>12V</td>
<td>240A input</td>
<td>5</td>
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</table>

Remote w/ 10m cable
BBURC
The Pro Charge B is a fully epoxy encapsulated, plug and play, battery to battery charger. It is primarily designed to be put between the starter battery and an appliance battery (trolling / bow thruster / domestic). The charger puts a load on the alternator and converts that load into a 4 stage charging profile to provide fast and effective charging to the leisure/domestic batteries. The whole point of the charger is to charge your batteries up when you drive/cruise along by fully utilizing your on board alternator. The charger is best suited for alfresco use to fully utilize its weatherproof casing. Therefore, it tends to be at home on bass fishing boats charging the trolling motor bank - it can be used in a plethora of other places.

**Boost / Reduce Charging.** The Pro Charge B shall ensure your batteries get the correct charging profile for your batteries irrespective of high or low input voltage.

**Multiple units can be used on the same installation.**

**Battery Chemistry type selection.** 6 battery chemistry types including AGM, Gel, sealed / flooded lead acid and LiFePO₄.

**Automatic mode** works from sensing voltage. **Manual mode** works from switch over ride. **Regenerative braking mode** the chargers stays on down to 12.2V.

**Thermal power reduction, allows for short high power runs to maximise power transfer.**

**Suitable for battery banks up to about 300Ah at 12V.**

**E marked. Suitable for OEM fitting.**

### Charging in a Bass Fishing Boat

**Prime Wiring example.** Not only does the Pro Charge B connect the 12V starter battery to the trolling motor bank it also chargers them at their correct voltage scale and profile. This encourages the alternator to work at a much higher capacity and results in faster charge between fishing stops and better maintenance of your trolling motor batteries.

**Ultimate Wiring example.** Why not charge the bass boat batteries while driving along? Connect a Pro Charge B from the truck starter via an Anderson type socket at the back of the truck to the Prime Wiring setup. This example allow you to fast charge while driving to and from the lake and then while cruising on the lake.

**Charging performance** of alternator or magneto without a Pro Charge B will produce about 1-2A. With a Pro Charge B you can expect the output from the charging source to run at a much higher rate - up to 28A at 12V. Larger alternators do not adversely affect the product as its current limiting.

**Shore Power Charger (AC to DC).** Directing shore power to the engine starter battery shall activate the Pro Charge B to charge the trolling motor batteries at their correct profile at 12V / 24V / 36V / 48V.
Advanced Alternator Regulators

**Pro Reg BW** (Waterproof)

**Maximum Alternator Rating:**
- With existing fitted regulator 350A alternator.
- With no fitted regulator 150A alternator

**Field Rating:**
- Positive Field Control = 8A maximum field current.
- Negative Field Control = 13A maximum field current.

**Waterproof IP66** (built to) - as the unit is sealed the longevity of the regulator is significantly enhanced as the circuit board is not exposed to the elements.

8 LED information display

<table>
<thead>
<tr>
<th>Pro Reg BW Waterproof Advanced alternator regulator</th>
<th>Voltage DC</th>
<th>L x W x D</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12V</td>
<td>120 x 80 x 45</td>
<td>0.4</td>
<td>AR12W</td>
</tr>
</tbody>
</table>

1 x Battery Temp Sensor (TSAY)

**Pro Reg D**

**Maximum Alternator Rating:**
- With existing fitted regulator 600A alternator.
- With no fitted regulator 400A alternator

**Field Rating:**
- Positive Field Control = 25A maximum field current.
- Negative Field Control = 30A maximum field current.

12V and 24V operation

Fan cooled allows for rating to be the highest of all Sterling regulators.

<table>
<thead>
<tr>
<th>Pro Reg D Advanced alternator regulator</th>
<th>Voltage DC</th>
<th>L x W x D</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12V &amp; 24V</td>
<td>180 x 90 x 55</td>
<td>0.5</td>
<td>PDAR</td>
</tr>
<tr>
<td>Remote control</td>
<td>170 x 90 x 40</td>
<td>0.25</td>
<td>PDARR</td>
<td></td>
</tr>
</tbody>
</table>

**Pro Reg DW** (Waterproof)

**Maximum Alternator Rating:**
- With existing fitted regulator 400A alternator.
- With no fitted regulator 200A alternator

**Field Rating:**
- Positive Field Control = 12A maximum field current.
- Negative Field Control = 18A maximum field current.

12V and 24V operation

**Waterproof IP66** (built to) - as the unit is sealed the longevity of the regulator is significantly enhanced as the circuit board is not exposed to the elements.

15 LED information panel

<table>
<thead>
<tr>
<th>Pro Reg DW Advanced alternator regulator</th>
<th>Voltage DC</th>
<th>L x W x D</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12V &amp; 24V</td>
<td>160 x 96 x 55</td>
<td>0.58</td>
<td>PDARW</td>
</tr>
<tr>
<td>Remote control</td>
<td>170 x 90 x 40</td>
<td>0.25</td>
<td>PDARR</td>
<td></td>
</tr>
</tbody>
</table>
Advanced Regulator features explained in more depth:

**Digital software control with slow start:**
Digital control (software) means that very complex information and mathematical algorithms can be processed that would not be possible with an analogue hardware system. Unit ramps currents early - prevents alt 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 is never the same. Older systems simply used fixed trimmers.

**Can be used in parallel or as a stand alone regulator:** These regulators can be used as stand alone and in parallel with existing regulators. Good practice to leave original regulator in place for fail safe.

**Programmable for different battery types:** Multiple charging profiles for AGM, Gel and lead acid cells.

**Single unit fits 99% of alternators:** Manufactures have multiple, we have one.

**Charges to 4 step constant current progressive charging curves:**

**Self diagnosing fault findings:**
The regulators scan the system every two seconds and if all the parameters are not within our preset values then the unit will switch 'off' and signal a fault. This is to prevent adverse damage to your batteries.

**Totally isolates the regulator in a fault condition:**
Sterling’s system physically breaks the field wire guaranteeing that the Advanced Regulator will stop working.

**Information LED display:**

**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:**
Sterling’s 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 (x2 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:**
Your standard regulator will automatically take over and allow the journey to continue but at a lower charge rate.

**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.

**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).

**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 (Sterling software will prevent this from happening).

**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:**
This is the only fan cooled regulator on the market (as per 2014) and offers the ability to connect this device to massive alternators if required. This unit can deliver field currents up to 20A+. This allows use on alternators way up to 600A plus or to 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.

**Warning:**
For large alternators (120A plus) where the existing regulator is non existent (Bulmar) then we recommend the Pro Reg D as this has fan cooling.

**Pro Reg Alternator max sizes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Alternator Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Reg B</td>
<td>up to 250A with standard reg / 130A stand alone</td>
</tr>
<tr>
<td>Pro Reg BW</td>
<td>up to 350A with standard reg / 150A stand alone</td>
</tr>
<tr>
<td>Pro Reg DW</td>
<td>up to 450A with standard reg / 150A stand alone</td>
</tr>
<tr>
<td>Pro Reg D</td>
<td>up to 600A with standard reg / 400A stand alone</td>
</tr>
</tbody>
</table>
The Alternator to Battery charger (A2B) connects very simply to an existing alternator(s) and provides extremely fast and effective charge to the domestic/house bank (5+ times faster than a stand alone alternator). The A2B achieves this performance by pulling down the voltage on the alternator by putting a 'load' on it. This low voltage (at high current) is amplified to a 4 stage charging profile at the domestic bank. Due to the A2B’s internal splitting system there is the option to charge the starter battery too. The starter does not get advanced charging, it simply gets a sufficient maintenance charge.

Quick and Easy Installation. This charger is effective, simple and fast to install. It transforms the output of the alternator into a sophisticated multi-stage charger resulting in faster and more complete charging of your house / domestic battery bank.

Largest model up to 400A (at 12V), 200A (at 24V).

Over 5 times faster charging. This charger optimizes the available output of the alternator and converts it to mimic that of a mains driven 4 stage battery charger. Consequently your batteries will charge faster resulting in less engine hours and a reduction in fuel used. This charger can therefore, pay for itself within a matter of weeks.

Smallest model 80A - 130A (at 12V).

Multiple alternator inputs. Numerous alternators can be fed to the input of the charger provided the total current rating does not exceed the charger’s rating. E.g. 400A charger can handle 4 x 100A alternators.

Starter bank and domestic bank charger. This charger has an intelligent integral splitting system. The output is split to the starter bank and to the domestic / house bank. Domestic receives advanced charging.

Multiple charging profiles. Chargers have AGM, Gel, flooded lead acid, sealed lead acid and calcium charging profiles.

Battery and alternator temperature sensing. The chargers disengage the unit in the event of the alternator temperature getting too high, it then re-engages the unit when the alternator cools down. The same thing happens when the batteries get too hot.

Not suitable for any modern European vehicle or any vehicle equipped with an advanced ECU. For suitable products - look to the range of Regenerative Braking Friendly devices – the Battery to Battery Charger.

Alternator to Battery Chargers
80A-400A (at 12V) 60A-200A (at 24V)

No alternator modification required. The charger is fitted between the alternator and battery(s) and, unlike conventional regulators, requires no modification or interference with the alternator whatsoever. This saves on time and bypasses any engine management systems (ECU) or warranty issues.
Alternator Regulator or Alternator to Battery Charger?

We are frequently asked this question. For an in-depth reason to choose the A2B over the alternator regulator, we recommend that you refer to our FAQ page. Here we shall discuss the main differences, the time it takes to wire up, engine management systems and warranty voiding.

Put simply the Alternator to Battery charger can be more easily and speedily installed, it tends to avoid any engine management issues and shall not void your manufacturer's warranty.

Additional features:
1) Battery sensor. When DC cables are long a voltage drop can be induced across it. There is a connector which allows for the compensation of this drop.
2) Ignition start. Some alternators require a voltage on the alternator to start up. There is a built-in device to overcome this problem in the event of such an alternator type being used.
3) The remote control. This offers full set-up information, plus voltages and temperatures of all the relevant places, as per the digital alternator regulator.

Optional Remote control for the AB12160/210/24100. 10m of pre-wired link cable and 2 x 200A shunts. Ideal for measuring current. Can be surface, recess or flush mounted.

Optional Remote control for the AB1280/12130/300/400. 10m of pre-wired link cable. Does not measure current.

### Alternator to Battery Chargers

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Max Alt size (A)</th>
<th>L x W x D</th>
<th>Weight Kg</th>
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Remote for above products in Black (no shunts) ABNRC

<table>
<thead>
<tr>
<th>DC (V)</th>
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<th>L x W x D</th>
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<th>Code</th>
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<td>AB24100</td>
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</table>

Remote for above products in Red inc 2 x 200A shunts ABRC
Larger Models: The image to the right is of the largest Pro Split R in the range. It handles 2 alternators in and 4 outputs. The outputs include 2 x starter batteries (one on each side) and 2 auxiliary banks. The alternator maximum is 130A at 12V for this model.

Micro Processor Controlled: All batteries are charged in conjunction with each other and back feed under high load conditions is prevented. The system also has the ability to disconnect the alternator and individual battery bank outputs in the case of problems caused by the alternator to other devices.

Comprehensive L.E.D. display: that shows which channels are in use and which are not.

0.01 voltage drop through the current range: This negligible voltage drop is far superior in performance in comparison to the old diode based splitting systems which suffered from a far greater voltage drop.

Backfeed protected: If there is a defective battery charger on one battery bank trying to back feed into another battery bank, the unit would disconnect that battery bank to save others.

Distributes the most power: to the battery bank which demands it.

Faster Battery Charging: 0.0V drop allows for a much faster charge. Additionally, once the Pro Split R is happy with the charge state of the starter battery the focus of the charge is directed to the larger domestic/house bank. This ensures a one on one charging experience between the alternator and house. N.B. The starter battery is always monitored and then prioritised if needs be.

Isolates the main alternator: If the alternator was to fail, the Pro Split R would isolate all batteries to protect them from over charging (boiling).

Isolates the battery bank(s): The unit isolates when there is any attempt to back feed the power from the full battery bank to a more demanding battery.

Overload Design: The model rated for 180A is actually continually rated for 240A with overload in excess of 2000A.

High Safety Elements Built In: As much safety and control is built in as possible to protect your electrical system and to ensure available power is directed to where it is required most.

Fail-Safe: In the event of unit failure, the engine start battery and alternator remain connected. This ensures the safe running of the boat/vehicle. It prioritizes the engine start battery charging over all other battery bank outputs.

Works with 2 x alternator regulators: Provides a 4 stage charging profile to each of the 4 outputs for super fast charging on all banks.

Not suitable for any modern European vehicle or any vehicle equipped with an advanced ECU. For suitable products look to the range of Regenerative Braking Friendly, such as the Battery to Battery Charger.
Examples of the problem where the old diode system can potentially be detrimental to both your battery charging rate and your batteries health/longevity.

Example 1
Note the 12.8V at the Domestic Battery. This battery shall not receive any charge and shall sulphate. At higher current, the voltage drop across the diode is higher.

Example 2
This example is with an intelligent regulator fitted. Note the 15.2V at the Engine Battery. This battery shall over charge. Note the 14.2V at the Domestic Battery. This battery shall under charge. At higher current voltage drop across the diode is higher.

Example 3
Note the 15.8V at the Engine Battery. This shall boil

The Cure. The Pro Split R has the cure to the diode based issues.

Shared key
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
This example is with an intelligent regulator fitted. Note the 14.7V at the Engine Battery. This battery shall charge properly. Note the 14.7V at the Domestic Battery. This battery shall charge properly. At higher current voltage drop across the Pro Split R is negligible providing a better charging system.

### Pro Split R 0.0 volt drop intelligent splitter

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Max Alt (A)</th>
<th>Battery banks</th>
<th>L x W x D mm</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>120A</td>
<td>2</td>
<td>150 x 80 x 120</td>
<td>0.6</td>
<td>PSR122</td>
</tr>
<tr>
<td>12V</td>
<td>180A</td>
<td>2</td>
<td>150 x 80 x 140</td>
<td>0.7</td>
<td>PSR182</td>
</tr>
<tr>
<td>12V</td>
<td>250A</td>
<td>2</td>
<td>150 x 80 x 155</td>
<td>0.9</td>
<td>PSR252</td>
</tr>
<tr>
<td>12V</td>
<td>120A</td>
<td>3</td>
<td>150 x 80 x 130</td>
<td>0.9</td>
<td>PSR123</td>
</tr>
<tr>
<td>12V</td>
<td>180A</td>
<td>3</td>
<td>150 x 80 x 150</td>
<td>1</td>
<td>PSR183</td>
</tr>
<tr>
<td>12V</td>
<td>250A</td>
<td>3</td>
<td>150 x 80 x 180</td>
<td>1.3</td>
<td>PSR253</td>
</tr>
<tr>
<td>Twin 12V</td>
<td>2 x 130A</td>
<td>4</td>
<td>150 x 80 x 295</td>
<td>1.8</td>
<td>PSRT134</td>
</tr>
<tr>
<td>24V</td>
<td>60A</td>
<td>2</td>
<td>150 x 80 x 120</td>
<td>1.8</td>
<td>PSR62</td>
</tr>
<tr>
<td>24</td>
<td>100A</td>
<td>2</td>
<td>150 x 80 x 140</td>
<td>0.6</td>
<td>PSR102</td>
</tr>
<tr>
<td>24V</td>
<td>150A</td>
<td>2</td>
<td>150 x 80 x 165</td>
<td>0.7</td>
<td>PSR152</td>
</tr>
<tr>
<td>24V</td>
<td>240A</td>
<td>2</td>
<td>150 x 80 x 250</td>
<td>1.2</td>
<td>PSR242</td>
</tr>
<tr>
<td>24V</td>
<td>60A</td>
<td>3</td>
<td>150 x 80 x 150</td>
<td>0.7</td>
<td>PSR63</td>
</tr>
<tr>
<td>24V</td>
<td>100A</td>
<td>3</td>
<td>150 x 80 x 175</td>
<td>1</td>
<td>PSR103</td>
</tr>
<tr>
<td>24V</td>
<td>150A</td>
<td>3</td>
<td>150 x 80 x 220</td>
<td>1.3</td>
<td>PSR153</td>
</tr>
<tr>
<td>Twin 24V</td>
<td>2 x 80A</td>
<td>4</td>
<td>150 x 80 x 295</td>
<td>1.8</td>
<td>PSRT84</td>
</tr>
</tbody>
</table>
Built in current limiting: Courtesy of the PTC fuses (red components jutting out of the unit), if overloaded, the product will simply shut off safely so as to protect the relay and the installation. Once the high load demand has been removed the relay is safe to re-engage.


0.0V drop charging relay: 0.01V drop is the voltage drop across the relay. This is a negligible drop allowing for the best charge possible across the relay.

Extremely low quiescent current, approx 1 mA.

Start up time delays: A 30 second start up time delay prevents the relay coming on while the engine is being started, protecting the relay circuit and preventing fuses blowing and damage to the relay.

Customisable on and off voltages: The voltage at which the relay closes and opens are default at 13.3V (on) and 13.0V (off) - twice for 24V. However, these thresholds can be adjusted.

Manual Override: The unit, by default, is voltage sensitive. It requires 13.3V to close circuit and 13.0V to open circuit. A manual override allows the user to dictate when the relay activates. Typical override would be an ignition feed.

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Rated (A)</th>
<th>L x W x D mm</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V &amp; 24V auto</td>
<td>70A</td>
<td>140 x 120 x 40</td>
<td>0.1</td>
<td>CVSR70</td>
</tr>
<tr>
<td>12V &amp; 24V auto</td>
<td>140A</td>
<td>140 x 180 x 40</td>
<td>0.2</td>
<td>CVSR140</td>
</tr>
<tr>
<td>12V &amp; 24V auto</td>
<td>210A</td>
<td>140 x 210 x 40</td>
<td>0.25</td>
<td>CVSR210</td>
</tr>
<tr>
<td>12V &amp; 24V auto</td>
<td>280A</td>
<td>140 x 240 x 40</td>
<td>0.25</td>
<td>CVSR280</td>
</tr>
</tbody>
</table>

IMPORTANT Safety Features (shared by CVSRs / VSRs and Ignition Fed Relays).
- High overload surge rating.
- Back EMF spark arrester.
- Emergency auxiliary forced activation.
- High battery voltage trip protection.
- Suppression diodes across relay to prolong life.
- SAEJ1171 ignition protected.
- 5 alarm functions and safety trips.
- Protects primary battery from discharge.
- Anti Relay contact arching protection.
- Reverse polarity protected.
Voltage Sensitive and Ignition Fed Relays

Ignition Fed Relays (refer to CVSR page for safety features)

Requires Ignition / D+ / Signal feed to operate: This range of low cost signal activated relays are 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.

Uni and Bidirectional charging relay: Multiple relays can be used to link / isolate as many battery banks as suitable.

Built to IP66 waterproof


Start up time delays: A 30 second start up time delay prevents the relay coming on while the engine is being started, protecting the relay circuit and preventing fuses blowing and damage to the relay.

Voltage Sensitive Relays (adjustable)

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Rated (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 &amp; 24 auto</td>
<td>80</td>
<td>0.1</td>
<td>VSR80</td>
</tr>
<tr>
<td>12 &amp; 24 auto</td>
<td>160</td>
<td>0.1</td>
<td>VSRB80</td>
</tr>
<tr>
<td>12 &amp; 24 auto</td>
<td>240</td>
<td>0.25</td>
<td>VSR160</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>50</td>
<td>0.1</td>
<td>VSR240</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>80</td>
<td>0.1</td>
<td>VSR8024</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>160</td>
<td>0.1</td>
<td>VSRB8024</td>
</tr>
</tbody>
</table>

Magnetic Digital VSR: The Digital VSR shares the same features as the above VSR80-240 range. It has fewer LEDs but is totally waterproof and ingress proof. This relay requires the use of the magnet to change the relays settings. The largest current rating is 160A.

Analogue VSR: The Analogue VSR is the most affordable VSR that Sterling does. It has no adjustable features. The user can not adjust the voltage thresholds and there is no switching delay. The unit is also not 12V / 24V auto select. They are simply 12V or 24V models. The unit has a fixed on voltage of 13.3V and the fixed off voltage of 13.0V. Ignition override is also possible.

Voltage Sensitive Relays (adjustable)

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Rated (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 &amp; 24 auto</td>
<td>80</td>
<td>0.1</td>
<td>VSR80</td>
</tr>
<tr>
<td>12 &amp; 24 auto</td>
<td>160</td>
<td>0.1</td>
<td>VSRB80</td>
</tr>
<tr>
<td>12 &amp; 24 auto</td>
<td>240</td>
<td>0.1</td>
<td>VSR240</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>50</td>
<td>0.1</td>
<td>VSR8024</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>80</td>
<td>0.1</td>
<td>VSRB8024</td>
</tr>
<tr>
<td>24 &amp; 24 auto</td>
<td>160</td>
<td>0.1</td>
<td>VSR240</td>
</tr>
</tbody>
</table>

Voltage Sensitive Relays Pro Con VSR range (80A-240A) (refer to CVSR page for safety features)

0.0V drop and low quiescent current. The voltage drop is 0.01V allowing for negligible power loss across the relay. The quiescent current is 1mA.

Automatic voltage activation. True to word the relays are sensitive to voltage. On voltage is 13.3V. Off is 13.0V (x2 for 24V). This can be manually changed.

Ignition/signal override is possible to allow for manual override.

6 LED information display

High quality brass connections.

Additional VSRs

Voltage Sensitive Relays (adjustable)

<table>
<thead>
<tr>
<th>DC (V)</th>
<th>Rated (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 &amp; 24 auto</td>
<td>80</td>
<td>0.1</td>
<td>VSRB80</td>
</tr>
<tr>
<td>12 &amp; 24 auto</td>
<td>160</td>
<td>0.1</td>
<td>VSRB160</td>
</tr>
</tbody>
</table>

Voltage Sensitive Relays Pro Con VSR range (80A-240A) (refer to CVSR page for safety features)

120A - 200A Ign. Fed relays 12V / 24V

<table>
<thead>
<tr>
<th>Part No.</th>
<th>R12120</th>
<th>R24120</th>
<th>R12200</th>
<th>R24200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Nominal (V)</td>
<td>12V</td>
<td>24V</td>
<td>12V</td>
<td>24V</td>
</tr>
<tr>
<td>Contact Current Rating (A)</td>
<td>120A</td>
<td>120A</td>
<td>200A</td>
<td>200A</td>
</tr>
</tbody>
</table>
Pro Latch R - Latching Relays

80A - 240A Models

The Pro Latch R is a versatile latching relay with 4 major operational modes. The benefit of using a latching style relay over a conventional relay is down to the efficiency of the relays. Conventional relays use up to as much as 0.5A to stay closed circuited. However, the latching relay does not use any current to stay closed. This is ideal for low harvest systems that include wind and solar. The 4 major operational modes are discussed below:

Operational Mode 1.
Bidirectional Charging Mode.
This mode allows activation of the Pro Latch R at both sides of the relay - ideal for normal between battery charging. Activation voltages are on at 13.3V and off at 13.0V.

Operational Mode 2.
Battery Protection Mode.
This mode allows the user to protect the battery from excessive charging and discharging. The on voltage is 12.0V and the off is 12.3V.

Operational Mode 3.
Engine Start Protect.
This mode allows the user to protect the start battery from discharging beyond a point whereby they can no longer start the engine when cranking. The on voltage is 12.6V and the off is 12.4V.

Operational Mode 4
Unidirectional Charging Mode.
This mode allows relay activation on one side of the relay only. Very similar to mode 1 without the bidirectionality. On at 13.3V and off at 13.0V.

More Efficient.
Latching relay technology is more efficient than conventional relays as they consume no power to stay closed. The only minor current drawn is via the software (0.5mA).

Intelligent switching algorithms.
All operational modes switch the relay between on and off positions. There is a time and history element to when the relay changes position, it is not a simple voltage threshold switch. This is designed to prevent unnecessary relay chatter and inefficiencies.

IP66 Waterproof.
The Pro Latch R is built to IP66, which is the highest level of waterproof and ingress proof rating.

Ideal for Solar and Wind technology. Along with other low harvest energy sources.

Models:
80A / 160A / 240A
12V and 24V.

12V or 24V Auto select.
The Pro Latch R’s can detect whether you have a 12V or 24V system and shall conduct its operation accordingly.

Remote Control Functions
1) Input Voltage.
2) Output Voltage.
3) Optional waterproof 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 metre telephone type extension lead. The remote is in a standard 54mm threaded housing. This is an optional product and is not required for the operation of the main product.

Models:
80A / 160A / 240A
12V and 24V.
### Examples of common applications for the Pro Latch R

#### Bidirectional charging relay

**Solar / wind**
- Typical small yatch
- Engine alt
- Charge Mode
- Domestic battery

**Bidirectional charging relay**
- Engine alt
- Charge Mode
- Domestic battery

#### Battery protection

- To electrical consumption panel
- Protect Mode (battery protection)

#### Product protection mode

- To Bow thruster Inverter Lights etc
- Protect Mode
- Charging source with ability to destroy onboard equipment

#### Engine Starter Battery Protection Mode

- Engine Start protection Mode / product protection
- to Inverter/Boat electrics or Tail lift / Vehicle electrics

#### Uni Directional Charging

- Charge Mode
- 14.8V from charger

#### Multiple use on small boat

![Diagram showing multiple use on small boat](image)

### Table of Specifications

<table>
<thead>
<tr>
<th>Code</th>
<th>Continuous Current</th>
<th>Max Intermittent Current</th>
<th>Max Intermittent Current mA</th>
<th>Quiescent Current</th>
<th>Input Voltage</th>
<th>Output stud</th>
<th>Preset Voltage Battery protect</th>
<th>Starter Protect</th>
<th>Charging mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR80</td>
<td>80A</td>
<td>500A</td>
<td>0.5</td>
<td>12V/24V auto</td>
<td>6 mm</td>
<td>Off 10.9V on 12.8V</td>
<td>Off 2.4V on 13V</td>
<td>on 13.3 off 12.9</td>
<td></td>
</tr>
<tr>
<td>LR160</td>
<td>160A</td>
<td>1000A</td>
<td>0.5</td>
<td>12V/24V auto</td>
<td>8 mm</td>
<td>Off 10.9V on 12.8V</td>
<td>Off 2.4V on 13V</td>
<td>on 13.3 off 12.9</td>
<td></td>
</tr>
<tr>
<td>LR240</td>
<td>240A</td>
<td>1500A</td>
<td>0.5</td>
<td>12V/24V auto</td>
<td>8 mm</td>
<td>Off 10.9V on 12.8V</td>
<td>Off 2.4V on 13V</td>
<td>on 13.3 off 12.9</td>
<td></td>
</tr>
<tr>
<td>LRB80</td>
<td>80A</td>
<td>500A</td>
<td>0.5</td>
<td>B = Budget: Relay only available with a fixed/non adjustable factory setting, non-programmable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LRR** Latching relay remote with 5 metres of cable, for longer use standard telephone cable extension.
Electrical Latching Battery isolation switches (ELBs) are used to completely isolate a battery bank to prevent any unwanted current drain from taking place. Typically users want to cut leaking from their starting system and from their appliance system. The key features to look for when selection ELBs are: Continuous rating (A), overload rating (A) and then the current draw when the ELB is on and off. Sterling’s ELBs excel in all these key features. Built to IP66.

160A - 640A Latching circuit rating: The products rating are their continuous rating. Work out what the continuous load shall be in order to rate the ELB to the correct specification.

D+ alternator ignition feed safety interlock circuit: If the latch position changes when the alternator is running damage can befall the engine/alternator. To prevent this, a signal override system has been installed. This signal (D+61/ ign feed) will prevent the switch position changing. Only when the signal has abated (engine turned off) will the latching relay switch.

Cold cranking / engine start: The ELBs can handle 1500A-6000A over 5 seconds and 600A to 2400A over a 30 second cranking period (model dependent).

The battery powering the ELB does not have to be the battery that you wish to isolate. Up to 50V for the latching circuit: The latching circuit is fine for voltage ratings up to 50V. The latching circuit and the control circuit are isolated. This is extremely important and means that the unit can latch on the negative or the positive of the battery that you wish.

Latching relay technology uses no current to stay closed or opened circuited. This means latching relays will not consume current from your system when turned on or off. The switching consumption does use current - about 2A for 0.5 seconds.

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

The control circuit is powered by either 12V (low as 8V) or 24V (low as 16V). Due to the low instantaneous power consumption of the controlling circuit you can tap the voltage off a larger bank 36V / 48V bank.

8mm studs ensure good contact for electrical cables.

Electrical Latching Isolation Switches
160 - 640A Models

### Electrical Battery Isolator

<table>
<thead>
<tr>
<th>Continuous rating:</th>
<th>30 sec</th>
<th>Starter rating</th>
<th>LWD mm</th>
<th>Weight Kg</th>
<th>Cont (A)</th>
<th>Control V</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>160A</td>
<td>300A</td>
<td>Not suitable starter</td>
<td>90x90x80</td>
<td>0.2</td>
<td>0</td>
<td>12V</td>
<td>ELB12160</td>
</tr>
<tr>
<td>160A</td>
<td>300A</td>
<td>Not suitable starter</td>
<td>90x90x80</td>
<td>0.2</td>
<td>0</td>
<td>24V</td>
<td>ELB24160</td>
</tr>
<tr>
<td>240A</td>
<td>450A</td>
<td>Car/small van</td>
<td>90x90x80</td>
<td>0.2</td>
<td>0</td>
<td>12V</td>
<td>ELB12240</td>
</tr>
<tr>
<td>240A</td>
<td>450A</td>
<td>Car/small van</td>
<td>90x90x80</td>
<td>0.2</td>
<td>0</td>
<td>24V</td>
<td>ELB24240</td>
</tr>
<tr>
<td>480A **</td>
<td>1000A</td>
<td>lorry, up to 600hp</td>
<td>150x100x120</td>
<td>0.4</td>
<td>0</td>
<td>12V</td>
<td>ELB12480</td>
</tr>
<tr>
<td>480A **</td>
<td>1000A</td>
<td>lorry, up to 600hp</td>
<td>150x100x120</td>
<td>0.4</td>
<td>0</td>
<td>24V</td>
<td>ELB24480</td>
</tr>
<tr>
<td>640A **</td>
<td>1300A</td>
<td>lorry, up to 1000hp</td>
<td>150x100x120</td>
<td>0.4</td>
<td>0</td>
<td>12V</td>
<td>ELB12640</td>
</tr>
<tr>
<td>640A **</td>
<td>1300A</td>
<td>lorry, up to 1000hp</td>
<td>150x100x120</td>
<td>0.4</td>
<td>0</td>
<td>24V</td>
<td>ELB24640</td>
</tr>
</tbody>
</table>

Extra momentary switch (one supplied standard in each kit) EL51
Key operated switch with 2 keys (optional extra) N.B only momentary switches can be used ELKS1

480A and 640A models
**Split Charge Diodes**

**70A - 200A Models**

Sterling power has developed a range of low cost split charge diodes, they benefit from enhanced performance over conventional diodes and at a lower cost.

Over coming voltage drop (0.8V - 1.2V). You can attempt to over come voltage drop across the Pro Split D by using a **Sterling Alternator Regulator**. This shall ensure that the battery bank of designate charge get its correct charging profile.

All other split charge diode manufacturers use conventional alternator diodes which, at a low current flow have about a 0.93V drop.

When the full rated current of these diodes is approached the voltage drop increases to around 0.95V. This results in excessive heat and power loss across the diode.

For improved charging and intelligent charging look at Sterling’s **Pro Split R and Alternator to Battery Chargers**.

### Recommended to be used in conjunction with an advanced alternator regulator

<table>
<thead>
<tr>
<th>Alternator inputs</th>
<th>Battery banks</th>
<th>Max Alt (A)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>70</td>
<td>D70A2</td>
</tr>
<tr>
<td>1</td>
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<td>70</td>
<td>D70A3</td>
</tr>
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<td>90</td>
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<tr>
<td>1</td>
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<td>3</td>
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</tr>
<tr>
<td>1</td>
<td>3</td>
<td>200</td>
<td>D200A3</td>
</tr>
</tbody>
</table>

### Charge rate with different splitting systems

<table>
<thead>
<tr>
<th>Conventional Splitters</th>
<th>Sterlings Pro Split D</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPS PASSED (A)</td>
<td>30 50 60 70</td>
</tr>
<tr>
<td>VOLTAGE DROP (V)</td>
<td>0.93 0.95 0.97 1.1</td>
</tr>
<tr>
<td>POWER LOSS (W)</td>
<td>27.9 47.5 58.2 77</td>
</tr>
</tbody>
</table>

Test alternator = Bosch 90ATIME/ MINUTES

Standard regulator output voltage = 13.83 Volts

### DC Isolation Switches

**200A**

- 200A continuous
- 1000A overload
- Waterproof cover
- Rubber boots for main cables
- 2 keys

**300A**

- 300A continuous
- 2000A overload
- 10mm studs
- Non removable handle

**500A**

- 500A continuous
- 4000A overload
- Lockable, Includes 2 keys, 10mm studs
- Non removable handle

**Key Features:**
- Spare Key, Cover seal for switch
- Rubber terminal protector
- Rubber terminal protector

### Conventional Splitters

<table>
<thead>
<tr>
<th>DC (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>200A</td>
<td>0.1</td>
<td>IS200</td>
</tr>
</tbody>
</table>

### Sterling’s Pro Split D

<table>
<thead>
<tr>
<th>DC (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>300A</td>
<td>0.3</td>
<td>IS300</td>
</tr>
</tbody>
</table>

### 500A Amp Battery Isolator Pro Isolator

<table>
<thead>
<tr>
<th>DC (A)</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>500A</td>
<td>0.35</td>
<td>IS500K</td>
</tr>
</tbody>
</table>
The Pro Combi S+ is Sterling’s new inverter charger. It is a bespoke unit that has an attractive new design. The unit is lighter, smaller, yet more powerful than its predecessor. New splash proof design offering some protection against the odd water spill. The Combi S+ also comes with an auxiliary charging output to allow the user to charge their starter battery whilst bulk charging their main battery bank. The auxiliary charging is simply a module that can be installed and allows the user to charge 12V from a 12V or 24V from a 24V or even a combination of them as it is simply a module (e.g. 12V from a 24V unit), unit built to IP22.

Remote control panel included. The remote is removable and can be replaced with a blank panel. The switch panel can then be remotely mounted using the supplied extension lead (10 meters).

30A automatic crossover switch: If shore power is connected to the combi the unit allows you to run your appliances directly from the shore power. However, when shore power is disconnected, the unit transfers the load from shore power to inverter power in less than 20ms, ensuring a smooth uninterruptible power supply.

Battery Charger only select option. Allows unit to be set, so in event of shore power failure the inverter does not engage.

Online Current consumption as low as 1.4A. Now fitted with new TX transformer and new TX transformer results in 50% less quiescent current.

New, lighter and smaller unit. Refer to the weights and dimensions in the table below. No extra length attributed to end cover caps etc as all AC and DC connectors are now neatly integrated into the unit.

The additional 5A auxiliary charging output port is a new feature of the S+ model. It allows the user to charge the starter battery (example). Also, you can pick and mix. For example, have a 12V main unit with a 24V output port, or vice versa.

Power Factor Corrected (PFC) This unit delivers a unity (0.99) power factor.

The Battery chargers across the range are larger in current rating, 70A at 12V - 35A for 24V.

Sterling Power’s Combi S+ range of Inverter / Chargers are new to 2016. They arrive in a bespoke and attractive waterproof enclosure (IP55).

Features a power saver function and battery charger power reduction. Great for smaller power supplies and gensets.

8 Battery type selectors. All with their own 4 stage charging profiles.

To make the choice even simpler we have 6 months exchange/upgrade policy. If you purchase the incorrect Combi and find there is some equipment that you cannot use, Sterling are happy to upgrade your unit for another with the only cost being the difference between the 2 products (the unit must be sent direct to Sterling and in good condition and postage paid for by customer). Offer applies dealing direct to the Sterling factory only.
Charger power reduction. Large chargers on Combs often require too much AC power from gensets. The Combi S2 allows the user to reduce the charger’s power consumption to within the rating of the genset / AC supply.

Remote control panel included. The remote is removable and can be replaced with a blank panel. The switch panel can then be remotely mounted using the supplied extension lead (10 meters).

8 Battery type selectors. All with their own 4 stage charging profiles. Custom set also available from panel, no computer required.

Sterling Power’s Combi S2 range of Inverter / Chargers are new to 2017. They arrive in a bespoke and attractive waterproof enclosure (IP55).

The additional 5A auxiliary charging output port is a new feature of the S+ model. It allows the user to charge the starter battery (example). Also, you can pick and mix. For example, have a 12V main unit with a 24V output port, or vice versa.

New, lighter and smaller unit. Refer to the weights and dimensions in the table below. No extra length attributed to end cover caps etc as all AC and DC connectors are now neatly integrated into the unit.

3200 automatic crossover switch: using latching relays which do not consume power. If shore power is connected to the Combi the unit allows you to run your appliances directly from the shore power. However, when shore power is disconnected, the unit transfers the load from shore power to inverter power in less than 20ms. This ensures a smooth uninterruptible power supply.

Low Quiescent current consumption. using transformer switching algorithms. Combis use current to produce power, even with no loads attached. A typical 12V 2500W Combi would use between 1.5-5A just to stay on and more for a 12V 3500W model. This is due to the flux requirements of the transformer. To run something like a 20W phone charger could consumer up to 80W from the battery. This is unacceptable. On our new units, on power saver mode, we have managed to get the quiescent current down to about 0.7A=8W. The phone charger, now, shall only consume 28W from the battery.

AC power timer. This feature enables the user to turn the inverter on for a set time - user sets 30 minute intervals (up to 5 hours). This is ideal as it allows the user to charge phones / tablets / laptops for a particular time and the inverter then turns off and consumes no current. E.g. Peoples’ mobile phones may require 1 hour of charge whilst in bed, so you

Multiple power saver functions. To preserve battery current we have devised 3 types of power saving functions - this allows the user to pick which one best suits their needs.

Designed to IP22

The Battery chargers across the range are larger in current rating. 130A->200A at 12V. 60-100A for 24V.

24 LED information display

Neutral = Earth bonding link when on inverter mode to comply with latest regulations. This allows RCD breakers to work.

Power Factor Corrected (PFC). This unit delivers a unity (0.99) power factor.

Battery Charger only select option. Allows unit to be set, so in event of shore power failure the inverter does not engage.

Remote Control w/ 10m cable

PS = Power Saver select
PE = Power Eco select
1/2hr = Power timer select
I/I = Charger power reduction
C/O = Charger Only
I/O = Inverter Only
Fault | Low battery | High temp LEDs

<table>
<thead>
<tr>
<th>DC Voltage (V)</th>
<th>Nominal VA</th>
<th>Power @ 20degC (W)</th>
<th>Charger (A)</th>
<th>Dimensions (L x W x D) (mm)</th>
<th>Weight (Kg)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>3200</td>
<td>2600</td>
<td>130</td>
<td>400 x 205 x 230</td>
<td>15.0</td>
<td>PC25123200</td>
</tr>
<tr>
<td>24</td>
<td>3200</td>
<td>2600</td>
<td>60</td>
<td>400 x 205 x 230</td>
<td>15.0</td>
<td>PC25243200</td>
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<tr>
<td>12</td>
<td>5000</td>
<td>3900</td>
<td>200</td>
<td>590 x 205 x 230</td>
<td>21.0</td>
<td>PC25125000</td>
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<tr>
<td>24</td>
<td>5000</td>
<td>3900</td>
<td>100</td>
<td>590 x 205 x 230</td>
<td>21.0</td>
<td>PC25245000</td>
</tr>
</tbody>
</table>

12V Combi to 12V battery 5A
12V Combi to 24V battery 3A
24V Combi to 24V battery 3A

Auxiliary Charge Module (ACM)
ACM12
ACM1224
ACM2424

3200 model
400L x 205W x 230D mm

5000 model
590L x 205W x 230D mm
Pro Power Q are Sterling's range of quasi / modified sine wave inverters. Quasi sine wave inverters work with most electrical appliances, including: hair dryers, phone, computer chargers, microwaves, kettles etc. Exceptions to this are appliances which are thyristor controlled, for example, washing machines or bread makers. It's the responsibility of the buyer to ensure that any products to be used on Quasi sine wave inverters is rated to do so. Some products do not work and can be damaged with this wave form. 

**Cost Effective:** Works out at around half the price of the Pure Sine Wave inverter. Yet it works with around 95% of electrical products.

Relatively small footprint for the power size.

Quiet operation due to new larger fan.

**230V 50Hz and 110V 50Hz. UK / Europe domestic use and building site use Europe, and 110V 50Hz for building sites.**

**1000W - 5000W**

<table>
<thead>
<tr>
<th>Code</th>
<th>Power (W)</th>
<th>Size LxWxD mm</th>
<th>Weight (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWR</td>
<td>350W</td>
<td>310 x 250 x 100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>600W</td>
<td>310 x 250 x 100</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>800W</td>
<td>420 x 250 x 250</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1800W</td>
<td>300 x 250 x 100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2300W</td>
<td>370 x 250 x 100</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>2700W</td>
<td>370 x 250 x 100</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>3700W</td>
<td>370 x 250 x 100</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>4000W</td>
<td>370 x 250 x 100</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Automotive type approval**

**1800W - 2500W**

<table>
<thead>
<tr>
<th>Code</th>
<th>Power (W)</th>
<th>Size LxWxD mm</th>
<th>Weight (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWR</td>
<td>1000W</td>
<td>240 x 250 x 100</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>1800W</td>
<td>300 x 250 x 100</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>2700W</td>
<td>370 x 250 x 100</td>
<td>5.0</td>
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<tr>
<td></td>
<td>4000W</td>
<td>700 x 250 x 250</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>5000W</td>
<td>700 x 250 x 250</td>
<td>10.0</td>
</tr>
</tbody>
</table>

**1800W 110V 50Hz**

110V / 50Hz models come with yellow sockets, remote control and engine interlock.

**230V 50Hz 12V DC Quasi Sine Wave Inverters**

- Universal: 12V 100W, 145L x 65mm, 0.2Kg
- Universal: 12V 150W, 145L x 100mm, 0.3Kg
- British / Euro: 12V 150W, 145L x 100mm, 0.3Kg
- Universal: 12V 200W, 145L x 65mm, 0.3Kg
- British / Euro: 12V 350W, 150 x 150 x 65mm, 1.0Kg
- British / Euro: 12V 600W, 230 x 150 x 65mm, 1.3Kg
- British / Euro: 12V 800W, 270 x 150 x 65mm, 1.8Kg

**1000-2700W Inc Remote control and 5 metres of cable**

- British / Euro: 12V 1000W, 240 x 250 x 100mm, 2.0Kg
- British / Euro: 12V 1800W, 300 x 250 x 100mm, 4.0Kg
- British / Euro: 12V 2700W, 370 x 250 x 100mm, 5.0Kg
- British / Euro: 12V 4000W, 700 x 250 x 250mm, 10.0Kg

**1000W-2700W models include a remote control with 10 metres of cable. Code: SWR**

**230V 50Hz 24V DC Quasi Sine Wave Inverters**

- Universal: 24V 100W, 145L x 65mm, 0.2Kg
- Universal: 24V 150W, 145L x 100mm, 0.3Kg
- British / Euro: 24V 150W, 145L x 100mm, 0.3Kg
- Universal: 24V 200W, 145L x 65mm, 0.3Kg
- British / Euro: 24V 350W, 150 x 150 x 65mm, 1.0Kg
- British / Euro: 24V 600W, 230 x 150 x 65mm, 1.3Kg
- British / Euro: 24V 800W, 270 x 150 x 65mm, 1.8Kg

**1000-2700W Inc Remote control and 5 metres of cable**

- British / Euro: 24V 1000W, 240 x 250 x 100mm, 2.0Kg
- British / Euro: 24V 1800W, 300 x 250 x 100mm, 4.0Kg
- British / Euro: 24V 2700W, 370 x 250 x 100mm, 5.0Kg
- British / Euro: 24V 4000W, 700 x 250 x 250mm, 10.0Kg

10000W-2700W models include a remote control with 10 metres of cable.
Pro Power SB (R)
Pure Sine Wave Inverters with USB and RCD Version

200W-5000W
Pure Sine Wave Inverters. Replicates true shore power, suitable for all appliances.
- With Twin Socket or built in RCD.
- Neutral Earth Bonding.
- DC cables supplied on 200W - 600W models.
- No DC cables supplied on 1000W - 5000W models.

230V / 50Hz
200W - 1600W
RCD optional

12V / 24V 1600W models.
110V / 50Hz Yellow Socket for site use
12V / 24V 1600W models.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power</th>
<th>Weight</th>
<th>Size L x W x D mm</th>
<th>Cables</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>200W</td>
<td>1.4Kg</td>
<td>210x190x85</td>
<td>1m Cig Plug</td>
<td>SIB12200</td>
</tr>
<tr>
<td>12V</td>
<td>300W</td>
<td>1.4Kg</td>
<td>210x190x85</td>
<td>1m DC 8mm ring</td>
<td>SIB12300</td>
</tr>
<tr>
<td>12V</td>
<td>1000W</td>
<td>2.2Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIB12600</td>
</tr>
<tr>
<td>12V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIB121000</td>
</tr>
<tr>
<td>24V</td>
<td>200W</td>
<td>1.4Kg</td>
<td>210x190x85</td>
<td>1m Cig Plug</td>
<td>SIB24200</td>
</tr>
<tr>
<td>24V</td>
<td>300W</td>
<td>1.4Kg</td>
<td>210x190x85</td>
<td>1m DC 8mm ring</td>
<td>SIB24300</td>
</tr>
<tr>
<td>24V</td>
<td>600W</td>
<td>2.0Kg</td>
<td>250x190x85</td>
<td>1m DC 8mm ring</td>
<td>SIB24600</td>
</tr>
<tr>
<td>24V</td>
<td>1000W</td>
<td>2.2Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIB241000</td>
</tr>
<tr>
<td>24V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIB241600</td>
</tr>
</tbody>
</table>

Option 2 Pre-Fitted with RCD and with 1 meter AC cable

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power</th>
<th>Weight</th>
<th>Size L x W x D mm</th>
<th>Cables</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>300W</td>
<td>1.5Kg</td>
<td>250x190x85</td>
<td>6mm connection</td>
<td>SIBR12300</td>
</tr>
<tr>
<td>12V</td>
<td>600W</td>
<td>1.8Kg</td>
<td>360x190x85</td>
<td>6mm connection</td>
<td>SIBR12600</td>
</tr>
<tr>
<td>12V</td>
<td>1000W</td>
<td>2.0Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIBR121000</td>
</tr>
<tr>
<td>12V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIBR121600</td>
</tr>
<tr>
<td>24V</td>
<td>300W</td>
<td>1.5Kg</td>
<td>250x190x85</td>
<td>6mm connection</td>
<td>SIBR24300</td>
</tr>
<tr>
<td>24V</td>
<td>600W</td>
<td>1.8Kg</td>
<td>360x190x85</td>
<td>6mm connection</td>
<td>SIBR24600</td>
</tr>
<tr>
<td>24V</td>
<td>1000W</td>
<td>2.0Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIBR241000</td>
</tr>
<tr>
<td>24V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>SIBR241600</td>
</tr>
</tbody>
</table>

110V / 50Hz model 1600W with Yellow Socket

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power</th>
<th>Weight</th>
<th>Size L x W x D mm</th>
<th>Cables</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>ASIB121600</td>
</tr>
<tr>
<td>24V</td>
<td>1600W</td>
<td>3.6Kg</td>
<td>300x190x85</td>
<td>8mm connection</td>
<td>ASIB241600</td>
</tr>
</tbody>
</table>

Remote control (fits all models) 90x60x20 5 metre SWR
AC Auto / Manual Crossover Switches

Pro Switch 32 - AC Automatic Switch 230V/110V-32A

The Pro Switch 32 is a 3 input 32A automatic crossover switch. It is designed to enable the user to connect 3 sources of AC to a central box (Pro Switch). The output of the Pro Switch is then intended to be directed to your ring mains. The 3 sources could be from shore power, an inverter and a generator. The Pro Switch prioritises the 1st input (typically shore power). It will then automatically switch to the neighbouring inputs when required.

3 Channel Sequential Switching. Channel 1 is priority (typically shore power). Channel 2 is typically a generator. Channel 3 is typically an inverter. If the inverter and/or generator is connected along with shore power, shore power is priority.

32A Internal Switch. Switches live and neutral with a 0.5 sec time delay to prevent wave doubling of the voltage and destroying sensitive equipment.

Remote on/off: This switch enables the shore power to be switched ‘off’ in the event of it not being powerful enough so that the more powerful inverter or onboard generator could do the job.

Shore Supply AC
Up to 7000W continuous 32A, 230V AC

Generator AC
Up to 7000W continuous 32A, 230V AC. 10 sec delay on the start up to allow generator stabilization before engaging gen set (on gen set channel only)

Inverter AC
Up to 7000W continuous 32A, 230V AC.

230V or 110V AC. Either voltage scale can be used and can be mixed.

Multiple internal power sources. The Pro Switch powers itself from the connect AC supplies not from the DC batteries.

Faults / Reverse Polarity check: The unit will show if there is reverse polarity on channel ‘1’ which is assumed to be the shore supply system.

Other Features:
Includes a 10s time delay on the generator line to all generator start up.

Optional 230V/20A Contact Relay

Supplied with 2 shafts for thin panel mounting and ½ panel mounting.

Manual 16A/30A/50A 3 way crossover switch

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

Easy to use
Easy to install
Front panel waterproof

Supplied with 2 shafts for thin panel mounting and ½ panel mounting.

Manual 230V Crossover Switches

<table>
<thead>
<tr>
<th>Input sources</th>
<th>Output</th>
<th>Continuous (A)</th>
<th>Max Voltage (V)</th>
<th>Number of poles</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>16</td>
<td>300</td>
<td>3</td>
<td>SC16A</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>32</td>
<td>300</td>
<td>3</td>
<td>SC32A</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>50</td>
<td>300</td>
<td>3</td>
<td>SC50A</td>
</tr>
</tbody>
</table>
Sterling’s High Voltage Protection Device (HVPD) is designed to protect any 230V AC supply such as: Generators / inverters / mains from incorrect voltage destruction. At some marinas / parks the mains supply voltage is wrong and this can result in the governor speed control / regulator / voltage controller failing (sticking). This can result in a dangerous situation for the operator and can destroy AC equipment. The HVPD is designed to prevent such destructions.

**Unit can be adjusted to 270 / 280 / 300V AC.** Detects a high voltage which can be adjusted to your requirements depending on the generator being used and its standard reaction to normal on / off loading.

**Reacts within 0.12 seconds to that set voltage.**

Please note, this is a high voltage safety trip and not an in line voltage conditioner.

The unit makes no attempt to smooth or fix the high voltage. It is designed to assume a catastrophic failure and switch everything it can off as fast as possible. This reduces / prevents the ensuing damage from that high voltage failure.

**6KVA direct protection**

**Unlimited power indirect**

**Multi product use covering Gen sets / Inverters / Mains**

**Test setting to confirm all is working.**

**Extra signal port for telemetry system information transmission if required.**

**If generator is over 6KW the power is disconnected by sending an external signal to a larger breaker to disconnect the main power.**

**If the generator is under 6KW the power is disconnected directly by switching its own 30A power breaker.**

**Suitable for generators and inverters of any size with indirect connection.**

**Suitable for generators and inverters up to 6KW with direct connection.**

**Built to IP66**

**LED fault indicators**

**30A overload trip (for internal wiring protection)**

**SKU**

HVPD 155 x 170 x 118 1.0

**Voltage Protection Device**

Voltage 230VAC, 50 Hz Max current 30A / 6KVA-gen set direct connection.

Voltage 230VAC, 50 Hz Max current 30A / 6KVA-gen set indirect connection.
The power management panel (PMP) is designed to display all the vital electrical information on an average boat. This enables important decisions to be made regarding faults and general onboard DC electrical power management. The information obtained also helps any third party engineer to identify problems.

### Shunt size:
- A 200A shunt is ideal for 2000W / 24V inverters.
- A 400A shunt is ideal for 4000W / 12V inverters.
- The shunts have a very high instant load ability which makes them fine for cranking ~1000A.

### Power Consumption
- 0.5 mA off / 0.7 mA on.

### Max readable current
- 199 A DC.

### Safe to over
- 1000A surges.

### LED Background light
- Perfect legibility in day and night times.

### Screen
- 16 digit 2 line LCD.

### Back light / switched
- Totaled automated function - no user intervention required.

### Accuracy
- + or - 1%.

### Power Management Panel
Up to 400A continuous, 1000A overload.

### 4 comprehensive channels.
Comprised of 4 voltmeters and 4 ammeters. There is one channel dedicated to Ah reading.

### Built in Ah counter.
This allows the user to measure the capacity remaining in their respective bank. Totally automated function - no user intervention required.

### Shunts can be connected to positive or negative cables.

### Each panel comes with a 200A /100mV shunt. (up to 3 extra shunts may be purchased) and a list of labels for the panel front.

### Each panel comes with one 200A /100mV shunt. Additional shunts can be purchased along with a list of labels for the panel front.

### 100mV shunts enable all current measurements to take place remotely from the instrument clusters, removing all the voltage drop and RFI problems associated with running heavy duty cables up to a control panel and navigation instruments.

### Power Management Panel
- Voltage: 12V & 24V
- Size: 170 x 90 x 40 mm
- Weight: 0.25 Kg
- Code: PMP1

### Extra 200A shunt
- Code: S200A

### Extra 400A shunt
- Code: S400A

### 200A continuous shunt = 200mm x 40mm x 50mm
### 400A continuous shunt = 260mm x 55mm x 50mm
Wind Up Multimeter (no battery)

- **Winding**: Wind twice for 2 mins use, wind for 10x for 10 mins
- **Display**: 46 mm x 23 mm large LCD
- **Measurement**: AC, ACA, DCV, DCA, Ohms, continuity beeper, Hz, %, Cap
- **Dimensions**: 152 x 78 x 45 mm
- **Weight**: 350g
- **DC voltage**: Range Volts 400.0 mV - 1000V DC Accuracy +/- (1% + 3d)
- **Input impedance**: 10 M Ohm
- **DC current measure**: 400mA - 10A
- **Ohms**: 400-40 M ohm
- **Capacitance**: 40nF-100 mF
- **Frequency**: 4 Hz - 4 MHz
- **Diode**: (forward voltage, VF)
  - **Range**: 4 V DC
  - **Resolution**: 0.001 V
  - **Test voltage**: 1.6V DC
  - **Test current**: 1 +/- 0.6 amps

Includes red and black test leads plus instruction manual
- **Continuity Beep**: (response time < 100 ms)
- **Data hold function**

DC Clamp Meter (ammeter)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>160mm x 35mm x 25mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>100g</td>
</tr>
<tr>
<td>Electrical Spec.</td>
<td>Meets IEC 1010 CAT11</td>
</tr>
<tr>
<td>DC voltage</td>
<td>0-200V overload protection 600V</td>
</tr>
<tr>
<td>AC voltage</td>
<td>0-500V overload protection 600V</td>
</tr>
<tr>
<td>DC current</td>
<td>0-600A overload protection</td>
</tr>
<tr>
<td>AC current</td>
<td>0-600A overload protection</td>
</tr>
<tr>
<td>Resistance</td>
<td>0-200 ohms overload protection 400V</td>
</tr>
<tr>
<td>AC freq response</td>
<td>40-400 Hz</td>
</tr>
<tr>
<td>AC spec tested on sine wave</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Compact yet heavy-duty</td>
<td></td>
</tr>
<tr>
<td>Continuity beeper</td>
<td></td>
</tr>
<tr>
<td>Data hold</td>
<td></td>
</tr>
</tbody>
</table>

DC Voltage Probe & Diagnostic Tool

- **Available voltages**: 12V / 24V
- **Battery Condition Reading**: Low 11.5V / 50% 12.0V / Full 25.2V (24V x 2)
- **Charger / Alternator output**: 13.2V (min) / 14.9V (max) / 15.9V (over volt) (24V x 2)
- **Weight**: 250g
- **Unique to Sterling Power**: CLAMP1

The load test. Depending on the size of the battery, this product adds a very high load to the battery (125A). 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.

Digital Battery Tester

Includes alternator and starter motor tests

What does the tester do?

To properly test a battery you need to test the voltage of it under a heavy load. This is what the Digital Battery Tester (DBT) does. The DBT puts a 125A load on the 12V battery for 10 seconds. It measure the rate of recovery of the battery’s voltage after the load has abated. The faster the recovery the healthier the battery. Superb device for measure battery condition.

- **10s Load test**: 125A
- **Voltage**: 12V (for 24/36V center tap)
- **Battery CCA rating**: 200-1000A
- **Battery Ah rating**: 30-140Ah
- **Indications**: good / weak / bad / sulphation extent
- **Battery Voltmeter**: yes
- **High Voltage trip**: 13V
- **Time between loads**: 120 seconds
- **Uses**: Batteries, Alternators, Starter Motors
- **DC Cable length**: 530mm
- **Size (LWD)**: 280mm x 100mm x 120mm
- **Weight**: 1.1 Kg

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.
The voltage & temperature monitoring system measures 4 voltages and 3 temperatures. Not only can the unit monitor, it can also have each channel alarm at specific levels. The high and low voltage alarms and the high temperature alarms can be set by the user. When the unit alarms, a relay circuit can be activated to induce a response.

**Manual lock or auto scan.** The unit will, on default, simply scan through all 4 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. 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 return automatically.

**Lock unit.** For security, there is the ability to lock the settings by a code. In the case you have locked the unit it will only be possible to cycle through the displays on the screen and to mute an alarm.

**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 prevents the use of anchors / bowthrusters influencing the low voltage point, as these devices are only transient. This value can be deleted to run a new low voltage monitoring.

**Removing unwanted alarms.** There is an upper (voltage + temperature) and lower voltage alarm (voltage) for each setting. You may not wish to engage some of these alarms, you can simply remove any alarms you wish not to use.

**Setting degree C or degree F scale.**

**Buzzer alarms:** for any alarms the buzzer can be on or off. If on, the alarm can be muted.

**Remote Control:**
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.

**Relay Circuit.** 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.

We predict this relay circuit shall be used to start up generators when the batteries get down to a certain voltage. Other examples, using temperature, would include an engine switching off under high system temperatures. There are an array of examples.

**Special Generator start ability.** Switching a relay to activate a generator is quite simple. However, knowing when to stop it is more difficult. There are numerous options to stop the generator based on voltage, temperature or time. For instance you may wish to stop the generator when the batteries hit a certain voltage / temperature / after a set time. There is also a safety timeout setting to prevent the generator staying on indefinitely because the battery charger has failed.

**Automatic backlight colour change.**
The backlight can change its colour automatically if the colour change value has been tripped.

In a 12V system: <12.2V = red, <13.2V = green, <15V = blue, >15V = red. These values can be changed for each channel individually.

<table>
<thead>
<tr>
<th>Input DC (V)</th>
<th>Size L x W x D mm</th>
<th>Weight kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-24V</td>
<td>70 x 70 x 60</td>
<td>0.2</td>
<td>TVM1</td>
</tr>
<tr>
<td>Extra temp sensors (1 included) purchase more</td>
<td>TS1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pneumatic Tank Gauge System

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 and that float meters are damaged in the tanks. 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 miniaturise for leisure craft, use until now.

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.

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

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.
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 boat's bonding system which is also connected to the hull/anodes etc. This ensures that any 230V mains faults will operate the R.C.D on the boat in order to save your life. However, now your boat is connected to the rest of the boats in the marina. This results in 2 main problems. Firstly, any increase in voltage on any earth in the marina may result in the dissolving of your anodes. Secondly, if you have a zinc/magnesium/aluminium anode on your boat and the boat next to you (or marina) does not then your boat shall be protecting everyone resulting in dramatic losses of anode.

The solution, Sterling’s Pro Save. The zinc savers maintain the continuity with the earth to ensure safety (EN ISO 13297 standard) but prevent any stray currents coming up the earth. The Pro Save has to be built to stringent testing and has to be able to carry its current rating for 24 hours without exceeding 90 degrees centigrade.

**16A 30A 50A models**

Rate to AC shore power rating.
Small Marinas 16A.
Medium Marinas 30A.
Large Marinas 50A.

For European use only due to ABYC non compliance.
Refer to overleaf for USA model ABYC compliant.

Available with or without Internally installed capacitors. The 30A and 50A models have 25,000uF 2.5V capacitors installed.

This raises performance in extreme AC leakage conditions.
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. For instance, if the earth voltage has exceed the ability of the device to protect the boat’s system (very rare this would ever be the case).

2) Total failure due to massive short circuit way beyond the products ability to protect. The product has failed and the boat and personnel are in danger. If this fault is triggered, there are underlying issues beyond that of the normal safety features of the shore power system. The over engineered aspect of this product cannot be overstated.

Safety first:
This product complies fully to European standard EN ISO 13297. Not to be used where UL / ABYC fail safe standard are required. See below.

Stainless steel hardware and very low footprint, made possible by a new induction fan cooling system which only operates when the unit is in a major fault condition.

Waterproof Zinc Saver off fault plus 20%

<table>
<thead>
<tr>
<th>Model</th>
<th>Fault Current (24 hours)</th>
<th>End Temp (Deg C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32A</td>
<td>41A</td>
<td>65</td>
</tr>
<tr>
<td>64A</td>
<td>85A</td>
<td>78</td>
</tr>
<tr>
<td>110A</td>
<td>152A</td>
<td>75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AC (A)</th>
<th>Waterproof Galvanic Isolator / Zinc Savers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size L x W x D mm</td>
</tr>
<tr>
<td>32</td>
<td>150 x 120 x 118</td>
</tr>
<tr>
<td>64</td>
<td>150 x 120 x 118</td>
</tr>
<tr>
<td>110</td>
<td>155 x 170 x 118</td>
</tr>
</tbody>
</table>
How does it work?
The unit is activated when the main battery has reached around 13.3V (26.6V at 24V) and allows excess power to be transferred from the primary charging system to charge / maintain an auxiliary battery bank. The transfer current is 3A at 12V.

4 options:
12V to 12V
12V to 24V
24V to 24V
24V to 12V

Ideal for use on Boats, Camper vans and with Solar / Wind top up.

IP65 Waterproof (rated to)
Ignition protected and reverse polarity protected.

It is simple to install and is a low cost product. Saving time on installation and money on repeatedly replacing destroyed flat batteries.

Power Saving. The battery maintainer uses FETs instead of relays and as such uses very little power itself (less than 1mA). This allows your solar harvest to be more efficiently distributed rather than lost across inefficient relays.

Other Specifications
- Offline power consumption: 0.001A
- Online power consumption: 1mA
- Activation voltage input battery (x 2 for 24V): 13.3V
- High voltage trip on input battery (x 2 for 24V): 15V
- High temperature lock down (Deg C): 80
- Off Voltage and Standby input battery (x 2 for 24V): 12.9V
- Reverse polarity protected (fuse).
- Aux battery ‘low voltage’ warning LED on if aux bat below 12.6V and ‘off’ above 12.7V.

Battery maintainer / charger inc 1 metre of cable

<table>
<thead>
<tr>
<th>Input (V)</th>
<th>DC</th>
<th>Output (V)</th>
<th>DC</th>
<th>Current (A)</th>
<th>L x W x D mm</th>
<th>Weight Kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>12V</td>
<td>3A</td>
<td></td>
<td>140 x 45 x 40</td>
<td>0.25</td>
<td>BM12123</td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>24V</td>
<td>1A</td>
<td></td>
<td>140 x 45 x 40</td>
<td>0.25</td>
<td>BM12241</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>24V</td>
<td>3A</td>
<td></td>
<td>140 x 45 x 40</td>
<td>0.25</td>
<td>BM24241</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>12V</td>
<td>1A</td>
<td></td>
<td>140 x 45 x 40</td>
<td>0.25</td>
<td>BM24121</td>
<td></td>
</tr>
</tbody>
</table>
High Power Distribution and Fuse Box
Up to 500A

Compact and clear DC distribution system for boats and specialist vehicles.

3 ANL fused outputs from 80-500A ability.

extra aux DC 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.

1 x 15A 'maintained' output with 30A fuse.

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).

Emergency alternator link in the event of the alternator fuse blowing (this prevents the alternator being damaged).

Red LEDs to show when fuse has blown (only on when fuse has blown).

Cable guides for the low power cables, plus cable ties to be tightened when wiring complete to keep wires tidy and secure.

Most negatives returned to box to enable easy circuit checks.

1) Retail market: can modernise your old system and make it safer and easier to find fuses/cables in case of faulty circuitry. Install near domestic to meet modern safety requirements.

2) OEM market: it shall reduce wiring time and improve cable tidiness. Replaces the need for many individual parts to be fitted and connected. Saving both time and money.

3 GANL fuses are required to complete the Distribution box (indicated by the 3 purple lines). They are not supplied with the package. Please refer to the chart below for the correct GANL codes.

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 amp</td>
<td>GANL80</td>
</tr>
<tr>
<td>100 amp</td>
<td>GANL100</td>
</tr>
<tr>
<td>150 amp</td>
<td>GANL150</td>
</tr>
<tr>
<td>200 amp</td>
<td>GANL200</td>
</tr>
<tr>
<td>250 amp</td>
<td>GANL250</td>
</tr>
<tr>
<td>300 amp</td>
<td>GANL300</td>
</tr>
<tr>
<td>350 amp</td>
<td>GANL350</td>
</tr>
<tr>
<td>400 amp</td>
<td>GANL400</td>
</tr>
<tr>
<td>500 amp</td>
<td>GANL500</td>
</tr>
</tbody>
</table>

DC High Powered Fuse Distribution Box

<table>
<thead>
<tr>
<th>Size</th>
<th>Weight</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 x 220 x 120 mm</td>
<td>1.5Kg</td>
<td>PPD500</td>
</tr>
</tbody>
</table>

Link to be removed if green LEDs not wanted, red LEDs will still work in event of fuse failure.

FINISHED UNIT
SHOULD LOOK LIKE THIS
(Black plastic cover lid removed for better picture)
ANL Fuse Holders
M8 (up to 500A) & M12 (up to 1000A) ANL

- 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.

M8 Gold ANL Fuse holder (no fuse included)

<table>
<thead>
<tr>
<th>Main connector</th>
<th>Current (A)</th>
<th>Size L x W x D mm</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 mm</td>
<td>500</td>
<td>145 L x 55 W x 53</td>
<td>GFH8</td>
</tr>
<tr>
<td>12 mm</td>
<td>1000</td>
<td>200 L x 66 W x 69</td>
<td>GFH12</td>
</tr>
</tbody>
</table>

Part Number GANL(x*) (AMPS) With mica window

*x = 80A, 100A, 150A, 200A, 250A, 300A, 350A, 400A, 450A, 500A

Full range of Gold plated ANL fuses
See Sterling Gold section

Fits 1 fuse up to 500A

Gold Plated Fuse Holders
24Kt Gold Plated

Solid Block Power Distribution

Battery Terminal sets (come in pairs)

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

All products are production matched from solid brass with a tight gold finish.
Jump Starting Modules

**Module 1 - JSC1**

Jump starter | DC to DC charger | Power Supply | Battery Balancer

Suitable for use with modern engines with Smart Alts/regen systems

Module 1 (below) fast / boost charges the auxiliary 12V/24V service batteries on the service vehicle when engine is running - this jump start and battery charging scheme is fully voltage regulated to prevent high voltages and so preventing any damage to the vehicle you are working on, for example, its ancillary equipment - such as ECUs. The unit can also continuously supply 24V to the lorry to charge the batteries. It can be left on indefinitely (as long as the van is running) as a power supply to allow long term heavy duty work to be carried out - tail lifts, etc. The service batteries are the donor batteries (below) in the jump starting process. These batteries, whether they be 12V or 24V, can be charged independently at 12V or 24V (isolated) at about 30A (12V or 24V). Simply connect it between the vehicle’s starter battery and the donor battery (as depicted below). This system shall automatically do all the charging with no human interaction. Module 1 can be used for manual jump starting, where the operator wishes to manually choose between 12V and 24V when jumping the recipient battery (overleaf). This offers both jump start and fast charge. Module 1 can be used without Module 2, the auto select module. The service vehicle’s own electrical system is fully protected from back feeds from the 12/24V side and any surges which will take place in the service vehicle’s jump start system.

Allows you to charge the batteries in a 12V and/or 24V mode at 30A / 12V and 30A / 24V when the service vehicle’s engine is running.

The charge is fast / boosted and is voltage regulated to prevent damage to any onboard ECU. This also allows smaller jump start batteries to be used as a 5-10 min connection to the charging system which will usually give sufficient charge to the batteries so that the jump start batteries are hardly used. In fact, with this system there is no real need for the batteries at all, as long as the batteries, to be jumped, are simply low and just need a fast charge.

This system suits regen. braking / smart alternators. It shall, therefore, complement modern Euro 5/6+ engines.

![Diagram](image.png)

**Module 2 Auto sense (optional)**

Both the appliance batteries and the batteries required to be jumped can be fast charged, provided the vehicle’s engine is running.

The preset fast charging profile is: Bulk / absorption of 14.4V (28.8V) and a float voltage of 13.5V (27.0V).

You can also force the charger into a boosted voltage of 14.8V (29.6V) if optional 2 is use. For option 1 simply stop service engine an then restart and you will automatically be in fast charge mode to the jump start vehicle.

No fear of centre tapped charging problems as both the 12V battery and 24V battery are charged independently at their own profile. Thus, automatically balancing the 24V bank.

**Module 1 kit (JSC1MK) optional**

JSC1MK - what comes with the kit?
- 3 x 100A (GANL100A) fuse.
- 3 x GFH8 fuse holder (GFH8).
- 12 x 8mm eye terminals for crimping/soldering to charge cables.
- THE KIT DOES NOT INCLUDE THE CHARGER.

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1</strong> (just the charger)</td>
<td>12V to 12V/24V Charger 30A w/ 2m pre-wired DC cable</td>
<td>JSC1</td>
</tr>
<tr>
<td>Module Kit (not inc. charger)</td>
<td>3 x 100A ANL fuse + 3 fuse holders + 12 x 8mm eye terminals</td>
<td>JSC1MK</td>
</tr>
</tbody>
</table>

**Fuse Holders and Fuses**

- 3 x GFH8
- 3 x 100A GANL fuse
Totally automatic safety function. If voltage sensed is 4V-16V then 12V is selected. If 16V-32V then 24V is selected. 12V and 24V modes can be forced if required, however, at 16V+ and 32V+ warning alarms shall sound. Also, trying to force select into a battery where the auto system disagrees will alarm and require the force select button to be pushed again. Below 4V the unit can also be forced, however, chances are the sub 4V battery shall need replacing.

Once the jump leads are removed from the batteries or the current drops below 5A the unit will automatically disengage. This safeguards against live 12V or 24V at the end of the jump cables which are not in use. If battery requiring jumping is not absorbing current, due to fault, this <5A disengage can be force overridden for 20 seconds to try to start the battery charge process.

Jump cables - not only provide automatic 12V or 24V jump starting they also charge the batteries if needed. Either in normal fast charge or an even faster boost charge. Both charge functions are fully regulated and will not damage any ancillary equipment in charging mode.

**Module 2 - JSC2**
Automatic 12V / 24V Auto Select Jump Starting Device

**Module 2**. This module adds an extra safety layer and automates the jumping procedure. It auto selects the correct voltage (12V or 24V) for jumping the recipient batteries. It also disengages the circuit when the jumping clips have been disconnected from the recipient battery terminals ensuring any jump leads not connected to a battery are “dead”. Module 2 also relays on the regulated charge profile generated from module 1 to the recipient batteries. You can also force the unit to operate outside of its preset parameters, in the few circumstances where this is required.

Once the relays engage, a signal is sent back to module 1 to force module 1 into boost mode. This enhances the charging voltage relayed on to the recipient batteries.

**From Module 1**

<table>
<thead>
<tr>
<th>CSA (mm²)</th>
<th>Colour</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Red</td>
<td>C50R</td>
</tr>
<tr>
<td>50</td>
<td>Black</td>
<td>C50B</td>
</tr>
<tr>
<td>70</td>
<td>Red</td>
<td>C70R</td>
</tr>
<tr>
<td>70</td>
<td>Black</td>
<td>C70B</td>
</tr>
<tr>
<td>95</td>
<td>Red</td>
<td>C95R</td>
</tr>
<tr>
<td>95</td>
<td>Black</td>
<td>C95B</td>
</tr>
<tr>
<td>120</td>
<td>Red</td>
<td>C120R</td>
</tr>
<tr>
<td>120</td>
<td>Black</td>
<td>C120B</td>
</tr>
</tbody>
</table>

**Battery and Jump cable (per meter)**

- Double PVC insulated welding cable
- Fuses for illustrative purposes only. Fuses should be connected nearer to input battery.

**Module 2**

DC cable length is optional. Please refer to the chart to the left. The image is for display purposes only. Cables do not come with the module kit.

**Jump cables** - connected to recipient batteries (batteries that require charging or jumping). These are not included.

**Jump cables** - not only provide automatic 12V or 24V jump starting they also charge the batteries if needed. Either in normal fast charge or an even faster boost charge. Both charge functions are fully regulated and will not damage any ancillary equipment in charging mode.

**Module 2 kit (JSC2MK) - what comes in the kit?**

- 4 x 500A ANL (GANL500A) fuse.
- 1 x GFH12 (for 2 x 500A ANL fuse).
- 2 x GFH8
- NO HEAVY DUTY CABLES SUPPLIED
- THE KIT DOES NOT INCLUDE MODULE 2 DEVICE.

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 2 (just the device)</td>
<td>Automatic jump starter</td>
<td>JSC2</td>
</tr>
<tr>
<td>Module Kit (not inc. device)</td>
<td>4 x 500A fuse w/ 1xGFH12 + 2xGFH8 fuse holder</td>
<td>JSC2MK</td>
</tr>
</tbody>
</table>

**Fuse Holder and Fuses**

- 4 x GANL500A
High Power Performance Alternators

12V / 200A
Good Low R.P.M Performance alternator supplied with multi V and twin V pulley. Photo shows multi V.

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V 200A alternator with standard reg</td>
<td>AL12200</td>
</tr>
<tr>
<td>12V 200A alternator with standard &amp; PDAR</td>
<td>AL12200PDAR</td>
</tr>
</tbody>
</table>

12V / 140A
Good Low R.P.M Performance alternator supplied with multi V and twin V pulley. Photo shows multi V.

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V 140A alternator with standard reg</td>
<td>AL12140</td>
</tr>
<tr>
<td>12V 140A alternator with standard &amp; PDAR</td>
<td>AL12140PDAR</td>
</tr>
</tbody>
</table>

Alternator Open Circuit Protection Device

Protects your alternator from massive spikes caused when a cable is loose or a fuse blows. Simple safe emergency route for that spike to be discharged giving full protection to the alternators regulator.

The protection device does not carry the main current of so only light wiring is required. Unit works with any alternator or splitting device (12V or 24V).

<table>
<thead>
<tr>
<th>Alternator protection device</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V 90 x 90 x 60</td>
<td>0.25</td>
</tr>
<tr>
<td>24V 90 x 90 x 60</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Pro Pulse
Battery De-sulphation & Maintenance device

Prolongs battery’s life by up to 100% and improves battery performance: Sulphate build up on plates reduces the battery's life span and performance. By connecting a Pro Pulse this sulphate is removed and allows the battery to live longer and have greater performance.

Connect across 12V: The Pro Pulse 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.

Not required if you already have an advanced battery charging system from Sterling as they have desulphation cycles built into their charging profiles.

This is not a battery charger and it cannot actually charge your batteries, it is a desulphation device.

Rejuvenates older battery(s) and sharpens their response. This allows them to accept faster charge and preserves their cold cranking ability.

Requires a charging source to operate. It shall not deplete your battery bank. Operation voltages are 13.3V+ (at 12V) and 26.6V+ (at 24V).

New Models good for up to 500Ah battery bank at 12V.

Waterproof IP66 (built to).

Offline current draw 1.8mA

Model good for up to 150Ah battery bank at 12V.

<table>
<thead>
<tr>
<th>Description</th>
<th>Size mm</th>
<th>Weight kg</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>De-sulphation unit 12V - up to 150Ah bank (IP66)</td>
<td>90 x 90 x 60</td>
<td>0.2</td>
<td>PPW12150</td>
</tr>
<tr>
<td>De-sulphation unit 12V - up to 500Ah bank (IP66)</td>
<td>90 x 90 x 60</td>
<td>0.2</td>
<td>PPW12500</td>
</tr>
<tr>
<td>De-sulphation unit 24V - up to 250Ah bank (IP66)</td>
<td>90 x 90 x 60</td>
<td>0.25</td>
<td>PPW24250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2M Pre-fused (80A / 100A) Cables</td>
<td>FRAWG6 AWG 6 Pre-fused (100A) Pre-wired, (2m), RED</td>
<td>FBAWG6 AWG 6 Pre-fused (100A) Pre-wired, (2m), Black</td>
</tr>
<tr>
<td></td>
<td>FRAWG8 AWG 8 Pre-fused (80A) Pre-wired, (2m), RED</td>
<td>FBAWG8 AWG 8 Pre-fused (80A) Pre-wired, (2m), Black</td>
</tr>
</tbody>
</table>

By connecting a Pro Pulse this sulphate is removed and allows the battery to live longer and have greater performance.

Connect across 12V: The Pro Pulse reverse feeds a small electrical pulse back into the battery which prevents and also reverses sulphation on the battery plates.

Waterproof IP66 (built to).

Offline current draw 1.8mA

Model good for up to 150Ah battery bank at 12V.

Cable available in Red or Black, fuse container black only.

Cable available in Red or Black, fuse container black only.
Daisy Chain - Temperature alarm

Most problems caused on engine systems can be pre-empted and stopped before any catastrophic failure takes place. Many of these failures are caused by run away temperature rises on batteries / hydraulic systems / bearings etc. The Daisy Chain can be installed in these key areas and an alarm is sounded and/or a relay triggered to prompt a response.

How does it work?
1 to 100 digital normally closed switch temperature sensors can be added in series. If any one of these sensor alarms (open circuits) are raised then a warning light comes on and/or a relay switches to prompt the response.

The Daisy Chain is a trip/warning device to indicate when a safe working temperature has been exceeded - this prompts a response from you or a preset automatic response.

Where would I use this?
A typical use would be if your batteries are prone to over-heating due to one being defective. Use a 60 Deg C sensor on each battery within the bank and the unit will inform you of over temperature on the bank.

Sterling has a more expensive version which looks at actual temperature and temperature rises. It also has remote display for the temperatures, look at the Sterling Voltage Temperature monitor.

Range of temperature sensors:
50 - 60 - 70 - 80 Deg C.

You can pick and mix sensors. It can be any manufacturer - provided the relay is normally closed circuited. Any sensor which goes from a closed circuit to an open circuit will alarm the unit.

Item description:

<table>
<thead>
<tr>
<th>Item description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V Connection box plus 1 x Remote LED 1 x Buzzer, Switch (alarm off).</td>
<td>TSB12</td>
</tr>
<tr>
<td>24V Connection box plus 1 x Remote LED 1 x Buzzer, Switch (alarm off).</td>
<td>TSB24</td>
</tr>
<tr>
<td>Temp sensor IP68 waterproof (No temp sensors supplied with unit)</td>
<td></td>
</tr>
<tr>
<td>50 deg C = 122 deg F Digital temp sensor</td>
<td>TSD50</td>
</tr>
<tr>
<td>60 deg C = 140 deg F Digital temp sensor</td>
<td>TSD60</td>
</tr>
<tr>
<td>70 deg C = 158 deg F Digital temp sensor</td>
<td>TSD70</td>
</tr>
<tr>
<td>80 deg C = 176 deg F Digital temp sensor</td>
<td>TSD80</td>
</tr>
</tbody>
</table>
What is Power Factor Correction (PFC)?
This can be split into 2 groups:
Active PFC - by far the best, this gives a full input voltage range from 80-300V, and (in more technical terms) massively reduces the VA off the product so it will work with about 40% less current and power from generators. This accounts for about an extra 20% cost over the other type.
Passive PFC - this is a simple way of matching the units capacitance with an inductor to balance the load. This allows the unit to pass EU laws regarding harmonic distortion but does not actually fix the harmonics. This results in a much lower cost product with much lower input voltage variations. I.e. 210-230V abilities at much higher VA rating so a generator would need to be about 40% larger to run the product. I.e. a 12V 60A active PFC charger would run on less than a 1000W gen set but a passive charger of the same size would need about 1500W.
This feature is a big deal and should not be ignored especially on boats or vehicles where there are large voltage variations on the input. Even in 110V or 230V only areas, the voltages can easily drop 10%. With Active PFC this is of no concern with Passive PFC the charger will simply stop working.

Power factor Correction (PFC) is the concept that cleans up the electrical waves. By doing so, it increases the efficiency of the charger significantly. Efficiency is measured by the power going out (DC) and the power going in (AC) times 100. Prior to PFC a chargers efficiency ran at about 65% (35% energy wasted through the charger). With PFC the efficiency figure is more like 90% (only 10% lost through the charger). PFC, therefore, makes electric bills cheaper and enables one to run the charger from a smaller generator.
Active PFC shall more than likely be advertised as a selling point to the product. If not advertised assume passive PFC.

IP RATINGS SCALE
The Ingress Protection (IP) rating system is an internationally recognized scale that relates to proven protection against environmental factors such as liquids and solids.
Ingress protection ratings can be identified by the letters IP, followed by two numbers. These numbers define the amount of protection a digital scale has against specified elements and its ability to resist foreign matter that could otherwise get inside the product and cause it to fail.
The first number refers to the amount of protection a scale or indicator enclosure has against solid matter (such as dust particles), while the second number defines the level of protection against liquids. The larger each digit is, the greater the protection.

<table>
<thead>
<tr>
<th>First number - Protection against solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second number - Protection against liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9k</td>
</tr>
</tbody>
</table>

Courtesy of www.averyweigh-tronix.com
What is Regenerative Braking?
Please see page 17 for a comprehensive explanation.

Why choose the Alternator to Battery Charger over an Advanced Alternator Regulator?
Ease of installation, is the simple answer. They both end up doing the same thing but by very different technologies. The advanced regulator is a lot cheaper but can be hard to fit. The alternator to battery charger is a lot more expensive, easier to fit and has a few extra features like an internal splitting system.

Why Choose a Battery to Battery Charger over an Alternator to Battery Charger and an Advanced Alternator Regulator?
The Battery to Battery Charger is a trouble free installation. Both the Advanced Regulator and the Alternator to Battery charger would cause problems with vehicles with complex ECUs. This is all European vehicles. Most American vehicles may still be okay (this will change over the years). The Battery to Battery Charger connects to the engine starter battery and has 100% nothing to do with the primary system (other than taking its power). All complex aspects off the primary system are left in tact. This ensures no problems will be reflected in the standard engine management system.

Which Battery to Battery Charger to use?

<table>
<thead>
<tr>
<th>Features</th>
<th>1 New Batt to Batt</th>
<th>2 Waterproof 60A-120A</th>
<th>3 IP68 waterproof</th>
<th>4 Original</th>
<th>5 Original with RBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterproof</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Including cables and fuses</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Current limiting</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>High V reduction and low V Boost</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Battery type adjustable 6 types</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Battery type adjustable 8 types</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Battery type adjustable 9 types</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Battery type adjustable 4 types</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Custom set</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Lithium battery type</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fan cooled</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RBF friendly</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Adjustable current limit</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>new 120-240 model</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Why Choose an Alternator to Battery Charger over an Alternator Regulator?
Alternator to regulators have the following disadvantages to the Alternator to battery chargers:

Relative difficulty to install: This limits semi skilled personnel for fitting.
Requires the removal of the existing alternator to work on it: This can be awkward and time consuming.
Requires extra cables to be run on the boat or vehicle: This can be again be time consuming and awkward.
Warranty on new engines: Some engine / vehicle dealers raise warranty issues if a new alternator is modified to fit an advanced regulator.

ECU Problems: Many new engines have ECU’s (electronic control units) on their engine management systems, any attempt to fit an advanced regulator will result in alarms going off (mainly in vehicles, motor homes and the latest marine engines). The Alternator to Battery Charger ensure the main vehicle / boat voltage remains within the ECU’s programmed parameters and allows the extra battery bank to be charged at the higher voltages needed to achieve fast charging.
Total Package: 95% of installations using an advanced alternator regulator also have some sort of split charger system whereas the alternator to battery charger already has that built in.
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 in the event of heavy current draw (larger than the rating of the product) such as engine starting and large bow thrusters/inverters. This also allows multiple units to be used on the same battery banks with no overloading of one unit. Any size charger / alternator can be used with a current limited device and this device shall limit the current to the rating of the device.

Can I use my solar panels in conjunction with Sterling's charging products?
Yes, they will work, they have nothing to do with each other but the solar systems will not affect nor interfere with any Sterling Power system.

How to Calculate Fuse Ratings.
In order to work out the size of fuse needed, follow this formula for working out the fuse rating, voltage or wattage for each appliance:

\[
P (\text{power Watts}) = V (\text{Voltage}) \times I (\text{Amps})
\]

The current the product will pull can be calculated by dividing the power used by the appliance by the voltage going into the appliance:

\[
I (\text{Amps}) = \frac{P (\text{Watts})}{V (\text{voltage})}
\]

For a fuse you like to work from 50-200% above this amp rating depending on the product. For example, if using a 2500W inverter which is about 200A load, the inverter may have a large short term overload of say 4000W, so the fuse would be able to deal with that surge. The same would be true for a bow thrusters, anchor winches, air conditioners where there is a sizable overload ability - rate to double the continuous load. However, for fixed loads with no overload (e.g. lights) then 30-50% above is fine. Remember, the fuse is to protect the cables not the product, also, note that any wire directly connected to a battery should be fused.

<table>
<thead>
<tr>
<th>DC voltage measured</th>
<th>DC 12V (fuse size)</th>
<th>DC 24V (fuse size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fridge (40W)</td>
<td>6A</td>
<td>3A</td>
</tr>
<tr>
<td>Hairdryer (1400W)</td>
<td>200A</td>
<td>100A</td>
</tr>
<tr>
<td>Kettle (1600W)</td>
<td>200A</td>
<td>100A</td>
</tr>
<tr>
<td>Laptop PC (350W)</td>
<td>50A</td>
<td>25A</td>
</tr>
<tr>
<td>Microwave (1400W back plate)</td>
<td>200A</td>
<td>100A</td>
</tr>
<tr>
<td>Television (300W)</td>
<td>50A</td>
<td>25A</td>
</tr>
<tr>
<td>Washing Machine (2200W)</td>
<td>300A</td>
<td>150A</td>
</tr>
</tbody>
</table>

Need a larger charger than Sterling can provide?
The Sterling Pro Charge Ultra range is digitally controlled and current limiting. This allows numerous units to be put together in parallel (to increase current rating) or to be put in series (to increase voltage rating). A typical example would be someone wanting 120A charger at 12V. Simply add 2 PCU1260 in parallel. Likewise, you could add 2 PCU2430 together in series to get 30A at 48V.

How to rate the size of a charger:
This very much depends on circumstance:

1) From standard shore power, the rule of thumb is to charge at about 10% of the Ah capacity of your battery bank(s). This is ideal if leaving to charge overnight or time is not a big factor. An empty battery (about 80% empty) would fully charge in about 8-10 hours.

2) If charging from a generator, to save on generator hours / fuel, it is recommended to rate the charger to 25%+. The larger the charger the faster the charge rate and the less hours on the generator’s set. This is a purely financially driven decision based your requirements.

3) A user may wish to really thump current in to their batteries in order to get them charged quickly between short stops. They may be using AGMs and are willing to replace them regularly (as they shall not live long). In this case rate the charger at around 50%+ of Ah capacity. For batteries like lithium it could be as high as 1C which is charging at the total rate of the battery’s Ah in one hour. You could actually use 400A of battery charging on a 400Ah lithium battery bank and charge in 1 hour.

Note. Rate to continuous onboard use. E.g. Using 50A, only charging at 20A, equals a 30A deficit. In this case, use at least a 50A charger.
How Effective is Advanced Battery Charging?

We are asked all the time ‘do I really need advanced charging on my batteries?’ What effect does a split charger diode have on charging? what % improvement will our products have on a system? Will the extra fast charging boil my battery? Will it excessively gas the battery? what effect, in real terms, can i expect? Most of the questions stem from old wives tales rampant in this market. The idea behind this article is to lay to rest any and all of them and offer the facts. Remember the below results are extreme and meant to show just how hard you can charge an open lead acid battery with no adverse effects. The results were all data logged and were 100% real and reproducible. They are neither guess work nor are made up.

Part 1: The effect of voltage on battery charging

There is no magic with advanced charging systems, in effect, all they do is increase the differential voltage between where the battery is and the charge voltage. In other words the higher voltage that is applied to a battery the faster it will charge. However, on the down side if you do not control that higher voltage after the charge then you will damage the batteries. This simple experiment will show you the direct relationship between actual voltage applied to a battery and the current (A) being absorbed by it. This will give you some idea how your system can be improved and where the problem may lie.

This information is 100% accurate and can be reproduced on any test bench at any time. The test is very simple and not open to misinterpretation. We will use a simple 100Ah lead acid, a low cost, nothing fancy battery. All we have done is to discharge the battery to about 50%, then connect it to a 180A regulated power supply. We will simply increase the battery and start a voltage of 13.2V and see how much current it will absorb from the power supply, then we will simply ramp up the power supply voltage and measure the extra current absorbed as the voltage increases.

For example, the red line shows that when the battery was 50% full at 13.2V the charge current was 35A and at 14.8V the charge current was 160A, an improvement off about 460%. However, on the down side the black line on the graph which was taken when the battery was about 70-75% full shows that, at 13.2V, the current was about 1A (showing that, at 13.2V, the battery was full (in its opinion)). Where, as at 14.8V we were still putting in about 60A, a charge improvement of 6000% (rather an improvement).

Why the specific voltages?: The voltages chosen are real voltages which one would expect to see in real life.

13.2V: this voltage appears in 2 main circumstances.
   a) If you use a split charge diode then one would expect this sort of voltage at the battery.
   b) Most alternators now have a built in temperature compensator on their regulator. When the engine room heats up (especially on a vehicle) then the assumption made by the alternator manufacturers is that the battery should be full. So, as the warmer air in the engine room is pulled past the regulator, the voltage from the alternator is reduced, the end result is we have seen standard vehicle alternators start off at 14V and drop to 13.2V in vehicles (with the bonnet down) after about 20 minutes. This is okay for the starter battery but will ensure your secondary batteries never charged (as per the graph).

For 24V x all voltages by 2

How much extra power is actually absorbed into the battery?

Having established the dramatic charge improvement which a battery can achieve with the increase in voltage, the many sceptics amongst us will now say’ the battery will charge faster, but nothing happens to it, you will over heat it and boil it, and all the extra current going into it is not being stored, it is simply being gassed off. Therefore the apparent fast charge is a waste of time. All you have done is wreck the battery. These all appear valid points yet are all prolific rumours. Now lets see if they are true or simply the old wives tales.

Part 2: will this fast charge rate cause problems?

With test 2 we take 4 x 100A identical lead acid batteries, as per the above test. We connect all 4 together and discharge them to the same level. Then we will charge one at a time (using a 200A regulated power supply) and over a 1.5 hr period and see how much charge in the form of A are absorbed into the battery and using an Ah counter we can measure the actual Ah which have passed into the battery. After the battery has completed its charge cycle at the allocated voltage we will then see if the A are actually in the battery as storage A. We do this by discharging the battery through an inverter with a 400 watt light bulb load and time how long each battery can run the load after it has completed its charge cycle. If the Ah counter shows more amp going into the battery and the load runs for a longer period of time, then the amps must have been stored in the battery. We will also measure the battery temperature before and after the charge run to see if the battery is in danger (50 deg C is when a battery starts to have problems) of over heating and boiling.

Answers to the questions based on actual facts:

1) Will the fast charge rate also put more into my batteries? One can clearly see that on the 13.3V charge only 21Ah were put into the battery as opposed to 50Ah with the 4.8V charger. An improvement of about 300%

2) Did this 300% improvement actually go into the battery or was it simply lost in heat and gas? The inverter discharge test clearly shows that the 13.2V battery ran the inverter for 48 minutes, where as the 14.8V test ran the inverter for 114 mins, a clear 230% improvement. So yes, the extra A were being stored in the battery, and were consumed by the inverter as this was the only place the inverter could get the power from.

3) Will the high charge rate boil my batteries? One can see in the test the battery temperature at 14.8V was from 18 deg C to 32 deg C, well inside the 50 deg required before there are any problems. Also bare in mind that this test was charging a 100Ah battery at 160A, in real life a 4 x 100Ah batteries you would need a 500Ah alternator or battery charger to be able to reproduce this test run, so it is unlikely that one would have a charging source that good.

4) Is it possible to put a lot of power into a battery in 1 hr? The graph clearly shows that the bulk of the power absorbed by the charger was in the first hour. So obviously, the battery was comfortable with this as the temperature rise was well within the battery’s limits.

5) A 100Ah battery gives 100A output? Similar to the 50Ah battery, at least 40% output tends to be of no use in a battery.

6) Are there any other benefits from this fast charging? Yes you also de-sulphate the batteries, this dramatically increases the life of the batteries and reduces the running hours of your engine and fuel costs associated with the charging of the batteries. In fact there are no downsides to this process.

Conclusion: Its quite clear that all the old wives tales. Now all you have to do is harness this information is to add a computer program to store the charging curves, allow the software to control the charge of your batteries, and then ‘hey presto’, welcome to the world of advanced digital charging from Sterling Power Products.
For unknown cable simply measure copper conduit diameter and equate to the above chart.

Safety Regulations demands any cable directly connected to a battery source must be fused.

Cable selection is based at approx 60 deg C 12V

Voltage drop

Critical equipment

Higher voltage drop

Non Critical equipment

Use only multi strand cable not solid core cable.

Warning: this is total cable length not distance to product.
Comprehensive installation, on a vehicle, involving Sterling's Pro Charge Ultra and Pro Batt Ultra

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Photo, courtesy of a major distributor, Intellitec MV.