

# STERLING POWER PRODUCTS

## ADVANCED POWER PRODUCTS MARINE, AUTOMOTIVE & INDUSTRIAL

### Instructions for the International Range Battery Charger



1210CE  
1220CE  
1230CE  
1240CE  
1250CE  
2415CE  
2425CE  
3616CE

Please read carefully before  
starting to install it!

Installationsanleitung (ab Seite 8)  
Vor der Installation sorgfältig  
durchlesen und Hinweise beachten!

[www.sterling-power.com](http://www.sterling-power.com)

## INSTALLATION OF STERLING BATTERY CHARGER

Position the charger in a cool dry well ventilated space, ensuring a reasonable air flow around the charger ( do not install in a cupboard or sealed compartment.

**This unit is fitted with an automatic 110/230 volt crossover as such the following voltage may be used ( 80-130 or 170-280 volts at any frequency ( 40-400 hz )**

install as close to the batteries as possible, preferably within 2 meters of the batteries.

Before installing, the charger must be set up. beside the output terminals one can see two sets of switches under the terminals, a switch bank of 3 small switches and a large single switch. the large switch ( s1 ) changes the equalizing or bulk charge voltage from 14.4 - 14.8 volts ( 28.8 - 29.6 for 24 volt units ) the 14.4 volt position must be used if gel or sealed lead acid batteries are used on any bank ( always avoid gel or sealed batteries for heavy cycling ), the 14.8 volt position should be used for conventional ventilated lead acid batteries and traction batteries. if in doubt go for the 14.4 volt position,

The switch in the down position confirmed by the top l.e.d being yellow is suitable for standard lead acid or traction batteries ( 14.8 volts/ 29.6 volts ) not suitable for gel or sealed batteries.

the small set of three switches changes the time of the equalizing charge by approx 1 hr per switch, in order to set

these switches divide the battery charger amp/hr into the battery bank size ( domestic bank ) e.g take a 25 amp charger on a 200 amp hr battery bank = a ratio of 8 : 1 . if the ratio is between 1-4:1 leave all switches on and the equalizing time will be approx 1hr, with a ratio of 5-9: 1 switch no 1 switch off, and this will increase the equalizing time to about 2hrs, with a ratio of 10-13: 1 switch nos 1 and 2 to the off position this will increase the time to 3 hours, with a ratio of 14 - 18: 1 switch 1 2 and 3 to the off position, this will increase the equalizing time to about 4 hrs.or set up as per label hints. **if in doubt set to the standard setting as per the label covering the output battery terminals.**

Having set the battery type switch and the equalizing time switches the charger should be installed, and need only be altered in the event of a battery type change or battery bank size change.

The charger may be mounted in any position . in the interests of safety connect the cables to the charger and run them to the batteries, the correct cable to use is multi strand automotive type cable. each strand is suitable to carry 1/2 an amp over about 2 meters, ie a 30 amp charger would require 50 strand copper cable.

Connect the cables as per the diagram, ensure that all terminals are used, ie in the event of only one battery being charged then connect the surplus positive output to the other used output, ie both outputs are on the same battery.

**It is extremely important to join any output terminal not being used on to one which is in use , ie if only 2 outputs are to be used then the third must be joined on**

to one which is being used, preferably to the one with the heaviest work load. failure to do this will result in reduced performance of the product,

charger operation 4 step charge: this unit is a battery charger/powerpack, its first job is to charge the batteries, upon switching the charger on the orange l.e.d and green ( or yellow depending on battery type ) comes on to show the charger is on full current ( constant current charge step 1 ) when the batteries reach 14.4 or 14.8 ( depending on battery setting switch ) the orange l.e.d. will go out and the lower green l.e.d will come on ( the upper yellow/green will remain on as well step 2 ) this shows the charger is on equalizing charge, ie at constant voltage at 14.4 or 14.8, the equalizing charge time will depend on the position of the timing switches. after the equalizing time is complete, the charger top led will go off leaving only the lower green l.e.d., this shows the charger is at constant voltage at 13.5 volts ( power pack mode step 3 ). on this mode the charger will supply its full current if required to maintain the power supply to the boat without using the batteries, in the event of the batteries being discharged below 11.5 volts ( step 4 )the charge sequence starts all over again.

### **The good the bad and the ugly about batteries.**

this is a list of questions and blunt answers about marine batteries and battery charging in the form of common questions and answers. there are so many old wives tales about this subject that these questions are compiled from my interaction with the public in the last 5 years at international boat shows

around the world.

the biggest problem in the marine world is that the public expect the same solution for all boats , most equipment is sold as leisure rated equipment, the larger boat owners who should be using commercial equipment should not be surprised with some of these answers,

### **How long will my batteries last?**

this is a very difficult question, in a nutshell the less you use the battery the longer it will last, never fully discharge a battery and always plug in the charger power pack where ever possible, remember that the batteries and set up on most boats from 20-40 ft are for leisure, if you use the boat for leisure purposes ie 3-4 weekends per month for 7 months plus 1 x 2 week period in the summer then expect about 3-5 years out of the average leisure type battery. however if you have a crew onboard, or live onboard, expect about 3-5 months use out of the same batteries ( in this case do not blame the batteries, blame the idiot who fitted a leisure battery in a commercial installation )

### **What is the best battery type?**

the answer to this is very much based on the above, for the average leisure user the best value is the conventional leisure ( sometimes called deep cycle but this is a myth ) battery, available at most chandlers, they will offer you 3-5 years trouble free operation, however if you think you are going to use these batteries and give them a heavy duty cycle then the only person you are kidding is yourself.

for live on board, crewed, 40 ft plus, blue water yachts, electric hungry boats with large inverters, there is only one option, use what the professionals use,

full traction these batteries come in either 2 volt cells or 6 volt cells, and will last approx 5-10 years in heavy duty cycles ( as with all batteries they do require a little maintenance ). **avoid gel and a.g.m. at all costs if long life and fast recharge is a main issue.**

#### **How many batteries do i require?**

the simple answer is the more the better, but most people are restrained by cost and size, this question i always throw back and ask you how long do you want the electrical system of your boat to be supported after the engine is switched off? in most cases the answer is 24 hrs, then add up your consumption ( 30 ft boat fridge = 5 amps, lights at night averaged out over 24 hrs = 5 amp/hr, total = 10 amp hr x 24 hrs = 240 amp/ hr add on 40% ( an empty battery is still about 40% full ) = about 300 amp hrs, ie three batteries of the 90-100 amp type.

#### **What type of battery do i use ?**

the type of battery used depends on your priorities, if you are worried about turning the vessel upside down and require no spillage of leakage then go for sealed batteries or gel ( but to not complain when the high charge rate obtained by conventional batteries is not attainable by these types ) my personal definition of a good battery is one i can charge with as much current as possible in order to charge them as fast as possible ( because you do not want to waste engine hours ) with minimum damage to the batteries, this can only be obtained by using open type lead acid.

**will your charger boil my batteries ?** quite simply yes and no.

**no if:** you look after your batteries, you check your oil level in the boat and water level, just because you never

check it in your car do not assume the boat duty cycle is the same. not only must you check the water level, check that with the charger or alternator on that when you look inside the battery cells a slight tap on the battery side should release small amounts of gas from all the cells, any cell not gassing remove the battery. expect to top up a battery, if you top up 5 cells and one requires no water scrap that battery. if when the charger or alternator is on and the batteries become warm or hot check the battery voltage, if the battery voltage is 14 volts or less and the batteries are boiling the fault is the batteries. if the batteries are 15 volts plus, the fault is the charger or alternator. do not fit a battery charger on to old batteries and go home, it is important to keep an eye on the batteries as a battery charger has all week to boil old batteries where an alternator only has a few hours, that is why most boiled batteries occur on a battery charger, and one must be able to distinguish between faulty batteries and a faulty charger

**yes if:** the batteries are on there last legs, batteries fail in four main ways ,

1) sulphate on the plates, this is due to a low voltage bad charging system, this will allow a coating on the lead plates to develop thus rendering the battery ineffective, this has the effect of no charge going into the battery, and is not actually a battery failure yet accounts for the largest proportion of battery replacement ( most times recoverable over a period of time if you fit an advanced regulator on the alternator or use a constant current battery charger with a high voltage charge cycle )

2) where a battery has had a hard use and the lead which is discharger from

the plates falls to the bottom of the battery, this will at some stage cause that battery cell to short out and cease to exist as a cell, this in effect causes the other cells to over charge, and as a result the water in the batteries is slowly ( at first ) gassed off, as the water level drops down the plates the gassing increases and increases until the battery gassing verses plate exposed goes into an exponentially catastrophic failure resulting in the boiling of the batteries, the only good thing about this type of failure is the knowledge that at least you used the batteries to there maximum. this failure can only be predicted by regular battery checks and you will notice 5 cells low on water and one not, it is important to scrap this battery in order to prevent boiling.

3) Poor maintenance of the batteries ie checking water level, permits the level to drop below the plated, this has the effect of reducing the voltage of each cell , and in effect causes the batteries to boil with a perfectly good charger

4) In the event of a charger failure the charger regulator could fail causing the full current of the charger to be pumped into the batteries causing a fast boiling in this case expect to see a battery voltage of 15 volts plus.

### **What do i look for and how do i stop my batteries boiling ?**

Boiling a battery is almost inevitable if you do not look regularly at your batteries to prevent them boiling, where as there is no doubt that the final act of actually boiling the battery only takes a few hours, the signs were there 4 weeks before, but you never bothered to check your batteries, therefore the first thing you knew was the nasty acid smell in the boat.

### **simple battery checks**

1) check water level, expect to top up ( this is good and shows your batteries are performing well ), the water used varies from none ( low charge rate week end boat ) to 8-10 litres per year ( heavily used boat )

2) switch on charger, after 5 hrs plus remove all lids, ensure all cells are gassing, remove any battery with a cell not gassing, with 24 volt system replace both batteries and not just one.

3) if when topping up a 6 cell battery ( 12 volts ) 5 cells take much more water than the sixth replace this battery .

4) if the batteries boil: if the voltage is less than 14 volts the batteries are the problem, 15 plus the charger is the problem.

### **Battery chargers in general:**

most members of the public make the same mistake when buying marine battery chargers, they simply go into a chandlers and ask for a 50 amp charger, there may be a choice of two 50 amp charger, one at x pounds and one at y pounds with about 30% - 50 % cost difference between them, in most cases they go for the lower cost unit.

it is very important that you stop buying battery chargers based on amps as this a totally irrelevant figure, most people when they buy a 50 amp charger are under the illusion that they can then run 50 amps worth of kit from shore power, how wrong can you be, in order to run that 50 amps worth of equipment you would require a charger to give 50 amps at 12.6 volts = 630 watts output power. however if the charger is a standard transformer unit it may only give 50 amps at 4 volts and only at 16 amps at 12.6 v = 200 watts, where as a constant current charger or switch mode power

pack will give 50 amps at 12.6 volts = 630. this means that two chargers which on the shelf appear the same are other sterling in fact separated by 300%, it is there fore important to find the output power of a charger and not its current ( the input power ie 240 volt end is irrelevant due to power factors, only 12/24 volt output power is relevant as this is what you actually get )

All sterling equipment carries a two year at factory guarantee the sterling range also includes advanced alternator regulators, inverters, dc/dc converters, 230 volt alternators, and other power equipment

Cable required ( always fit charger as close as possible to the batteries ).

**10a, 15a & 20a –charger:**

- for cable runs of 2 m -> 6mm<sup>2</sup>
- for cable runs of 5 m -> 10mm<sup>2</sup>

**25a, 30a & 40a - chargers:**

- for cable runs of 2 m -> 16mm<sup>2</sup>
- for cable runs of 5 m -> 35mm<sup>2</sup>

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**50a charger:**

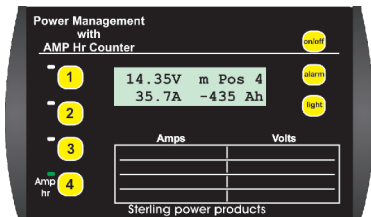
- for cable runs of 2 m -> 25mm<sup>2</sup>
- for cable runs of 5 m -> 35mm<sup>2</sup>

**Other Sterling Products of interest**

**UNIVERSAL DIGITAL ADVANCED ALTERNATOR REGULATOR**



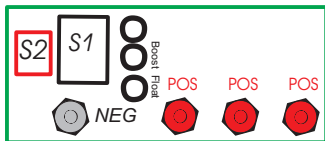
**CHARGE YOUR BATTERIES FASTER FROM YOUR STANDARD ALTERNATOR AND PUT MUCH MORE POWER INTO THEM**



**POWER MANAGEMENT PANEL**

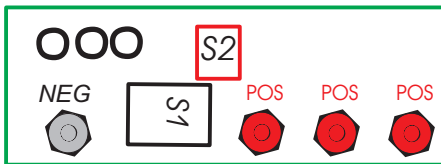
**4 X VOLT METERS  
4 X AMP METERS  
1 X AMP HR COUNTER  
CAN BE FITTED IN NEGATIVE OR POSITIVE CABLES**

1210CE  
1220CE  
2415CE



COMMON NEGATIVE OUTPUT ISOLATED POSITIVE OUTPUTS

1230CE  
1240CE  
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2425CE  
3616CE



COMMON NEGATIVE OUTPUT ISOLATED POSITIVE OUTPUTS

## ABSORPTION TIME CONTROL

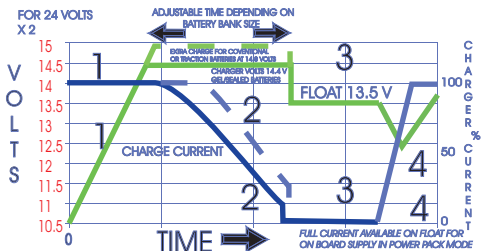
APPROX 4 HR, IDEAL FOR FULL TRACTION APPLICATIONS AND BOATS WHERE BATTERIES ARE CHARGED FROM GENERATORS MOST OF THE TIME

APPROX 3 HRS, IDEAL FOR BOATS WHICH USE GENERATORS AND SHORE POWER TO CHARGE THE BATTERIES

APPROX 2 HRS, IDEAL FOR BOATS WHICH USE SHORE POWER ONLY AND THE BOAT IS USED REGULARLY (IE DISCONNECTED EVERY DAY)

APPROX 1 HR, IDEAL FOR STANDARD LEISURE BOAT USE OR LIVE ONBOARD

S2



STEP 1 = CONSTANT CURRENT CHARGE      STEP 2 = ABSORPTION CHARGE AT 14.4/14.8 V  
STEP 3 = CONSTANT VOLTAGE AT 13.5 VOLTS      STEP 4 = LOW VOLTAGE RESET TO STEP 1

