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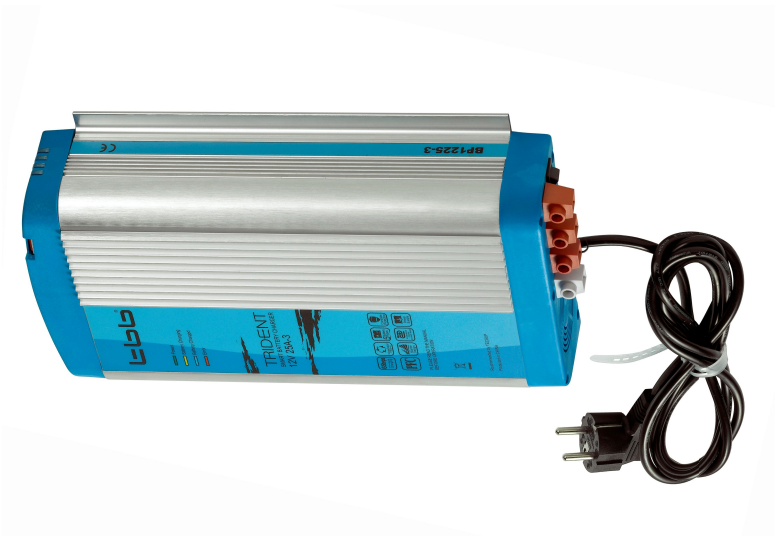
TRIDENT

SMART BATTERY CHARGER



TRIDENT

SMART BATTERY CHARGER

RV MARKET

MARINE MARKET

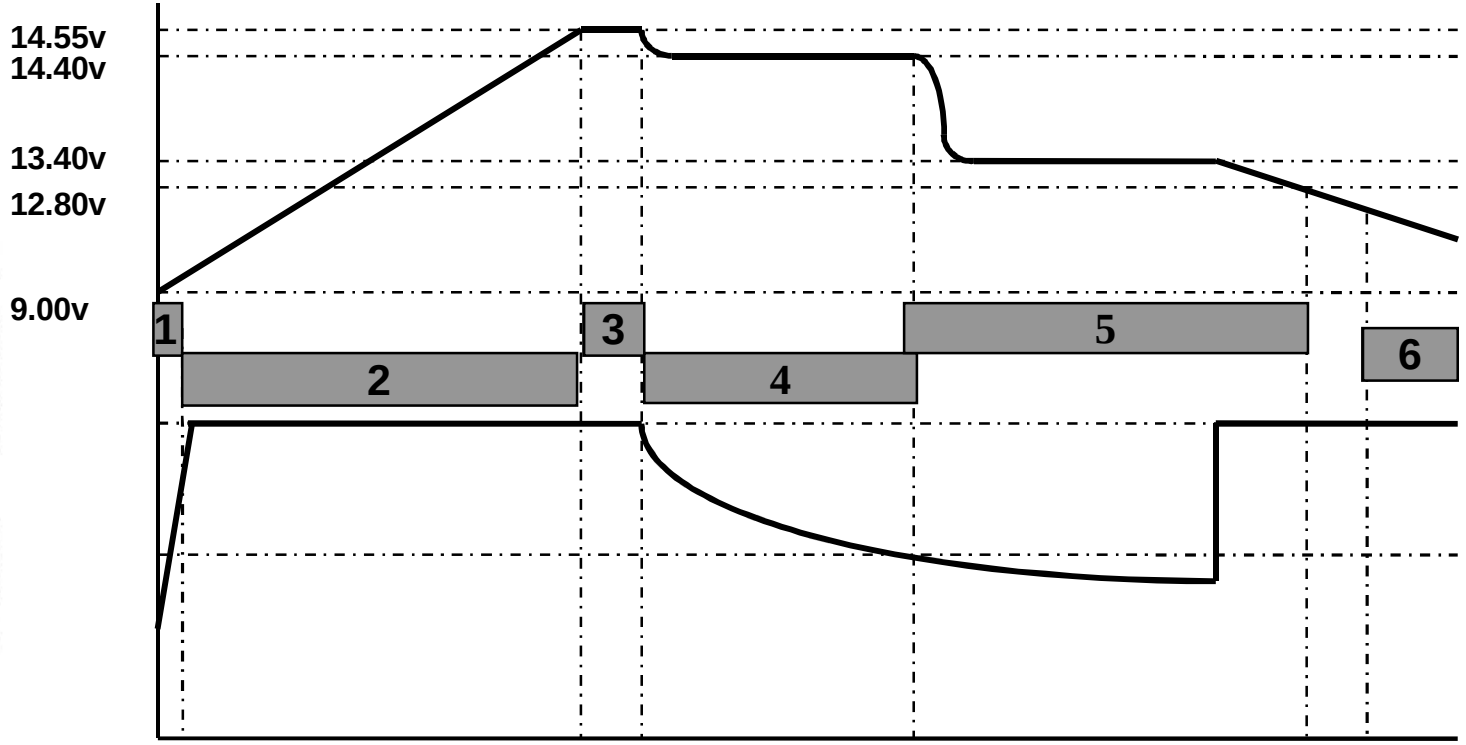
Reasons to choose TBB Trident smart battery charger

- **Fast and Reliable**
- **Fully automatic for 100% charging**
- **Longer life for battery**
- **Marine application design**

TRIDENT
SMART BATTERY CHARGER

Features – Automatic 6 steps charging

- **Fully automatic 6-steps charging curve offering premium charging**



TRIDENT
SMART BATTERY CHARGER

Features – Automatic 6 steps charging

- **Stage 1 : Soft start**

  Trident start charging from 9V and raise charger voltage afterwards ensuring a stabilized charging current. This can avoid possible too high charging current which might damage the battery

- **Stage 2 : Constant Current (or bulk stage)**

  Trident smart charger adjust itself to ensure a stabilized charging current for a fast and safe charging. This stage can finish about 80% of the charging

- **Stage 3 : Compensation**

  After finishing bulk stage and before absorbtion stage, charger will raise its charging voltage by 0.15V for about 3mins worked as compensation for voltage drop on the cable.

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SMART BATTERY CHARGER

Features – Automatic 6 steps charging

- **Stage 4 : Constant Voltage (or absorption stage)**

  Trident smart battery charger will fix its charging voltage according to selection of battery types, this stage will finish remaining 20% charging

- **Stage 5 : Floating**

  When charging current drop to preset limit, the Trident will turn into floating charging which will keep your battery full while long time no use.

- **Stage 6 : Recycle charging : every14days**

  While long time connected and not in use, the battery electrolyte will come into dull, which will reduce the battery life. We set up recycle charging every 14days to activate battery. This function will help to prolong your battery life for intermittent usage application.

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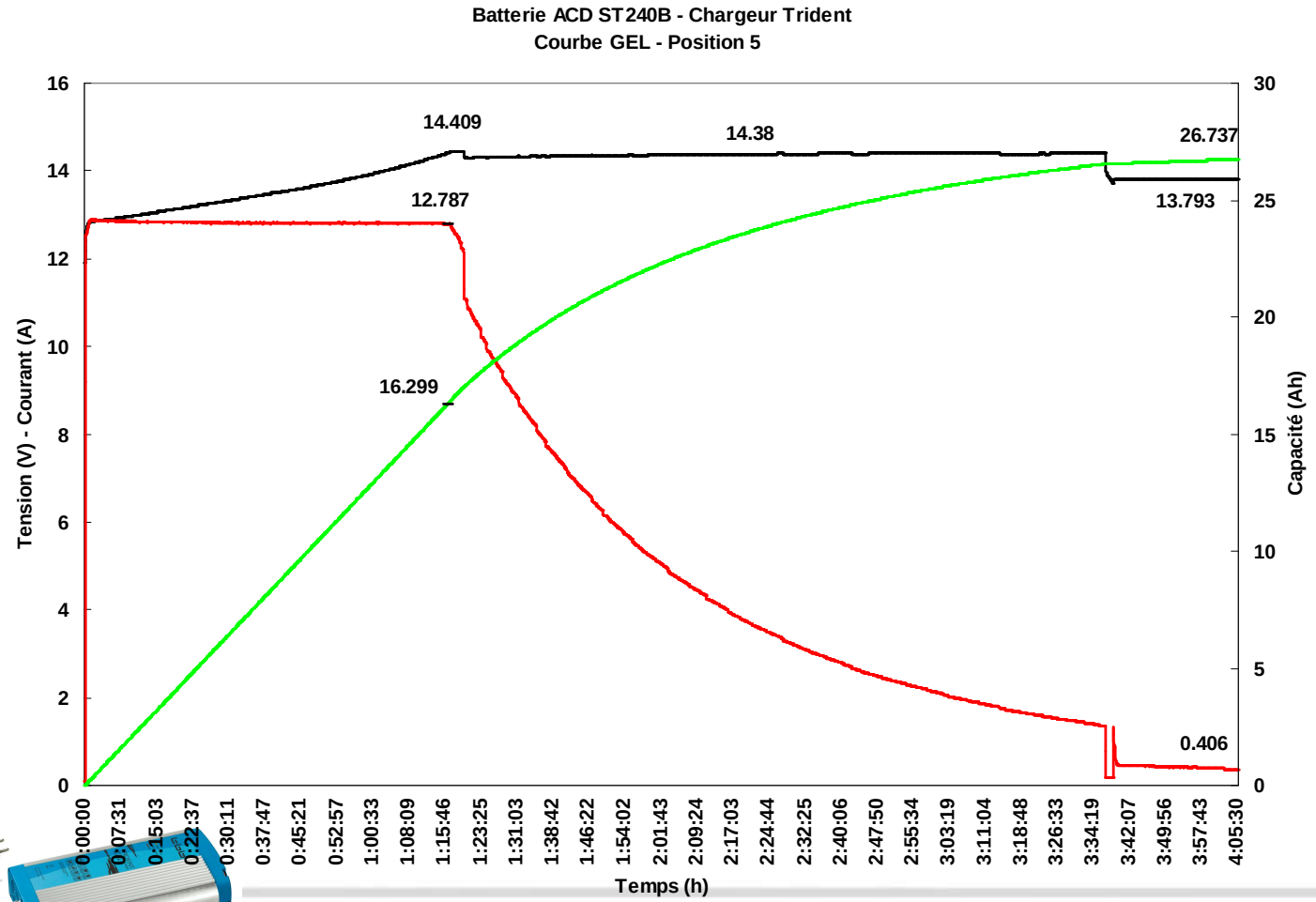
SMART BATTERY CHARGER

Features – Automatic 6 steps charging

**** Following is the actual curve recorded ****



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Features – Optional equalization charging program

TRIDENT smart battery charger offer equalization charging program

- **PURPOSE : Equalization charging program can be used to ensure that individual cells within the batteries are fully charged, equal to one another. And, the electrolyte is stirred up by the light gassing of the cells.**
- **This charging program is recommended to use once 1-2 months ONLY**
- **TRIDENT smart battery charger offer equalization program for Freedom (Maintenance Free battery) ONLY. New charging program for FLOODED battery is coming.**

NOTICE : Because frequent use of this charging program can damage your battery. To protect against careless setting making sure each use is being chose consciously, this program can be activated only after battery is switching ON. As a protection, Trident smart charger will stop charging if the switch is set to ON before battery charger is switching ON.

NOTICE : During this charging program, please DO NOT connect DC load to charger meantime. Too high voltage at this program might damage your DC appliance

TRIDENT
SMART BATTERY CHARGER

Features – Simultaneously recharging and power supply

- **Trident smart battery charger can be used to satisfy your DC load and use balance to charge battery simultaneously.**
- **To avoid battery to be discharged without being aware in this application, Trident charger will start another cycle charging after battery voltage drop under 12.8V for some time.**

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SMART BATTERY CHARGER

Features – DC Power Supply

- **Through selection on dip switch at front panel, you can turn Trident charger into purely power supply at 13.5VDC, making our charger to be more functional.**

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Features – Isolated multiple outputs

- **We have 2 or 3 outputs for various models for you to charge 2-3 battery bank simultaneously.**
- **All outputs are being isolated internally, no extra battery isolator are necessary.**

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Features – Easily choose 4 options

- **Trident smart battery can charge both flooded, freedom (maintenance free), GEL and AGM battery, of which can be set through dip switch at front panel.**

	Switch position	Absorption	Float
Flooded	OFF-OFF-OFF	14.4V	13.3V
Freedom	OFF-OFF-ON	14.8V	13.8V
GEL	OFF-ON-OFF	14.4V	13.8V
AGM	OFF-ON-ON	14.2V	13.6V

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Features – Automatic Temperature compensation

To assure a right charging at any temperature, Trident smart battery automatically compensate the chargi ng according to ambient temperature,

Electrolyte Temperature degree F	Electrolyte Temperature degree C Degrees C	Add to output voltage (V) Output Voltage
140°	60.0°	-1.188
130°	54.4°	-.990
120°	48.9°	-.792
110°	43.3°	-.594
100°	37.8°	-.396
90°	32.2°	-.20
80°	26.7°	0
70°	21.1°	+.198
60°	15.6°	+.396
50°	10°	+.594
40°	4.4°	+.792
30°	-1.1°	+.990
20°	-6.7°	+1.188
10°	-12.2°	+1.386

TRIDENT
SMART BATTERY CHARGER

Standard :
@3.3mV/degree F/cell

Features – Complete protection

Trident smart battery charger designed complete protection internally which including :

- **Battery over-temp**
- **Battery charger over-temp**
- **Short cut**
- **Overload**
- **Reverse polarity**

Electronic reverse polarity protection was designed, no need to change fuse in case of reverse polarity happened, which bring a lot convenience for end users for careless mistake

TRIDENT
SMART BATTERY CHARGER

Features – Marine application features

- **High ambient temperature rated**

  Trident smart charger are rated at **40C**, which meantime a lot charger are rated at 35C or even 30C

- **Surge protector**

  A powerful surge protector was design inside to protect frequent surge happened on shore power.

  Notice : this surge protector is the last chain of protection with limit capacity. A SPD is still needed at power distribution box as required by IEC.

- **PCB Coating**

  PCB was coated against salt moisture in sea application against corrosion

TRIDENT
SMART BATTERY CHARGER

Features – Marine application features

- **Silent design**

  We care about user at sea application, special care was carried out on product to reducing fan noise.

- **Galvanic Isolation**

  AC and DC is being galvanic isolated.

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Features – Wide voltage operation

- **Trident smart battery charger can work under both 230VAC shore power and 110VAC shore power, with 50% rated output at 110VAC shore power.**

TRIDENT
SMART BATTERY CHARGER

Features – Active PFC design available

What is PFC

- A chargerôs power factor rating can be explained as its ability to effectively use the utility AC power. The more efficiently the charger uses incoming AC, the higher the power factor it will have and the less AC power it will consume. With less required by charger, there will be more available for other appliance like microwave, TV etc.

- The PFC (power factor correction) circuit is designed to draw a sinusoidal current from the utility power that is exactly in phase with input voltage. TBB PFC version charger are rated at 0.95 power factor compared with less than 0.70 of non PFC version. The improved power factor results in about 30% less AC power consumption.

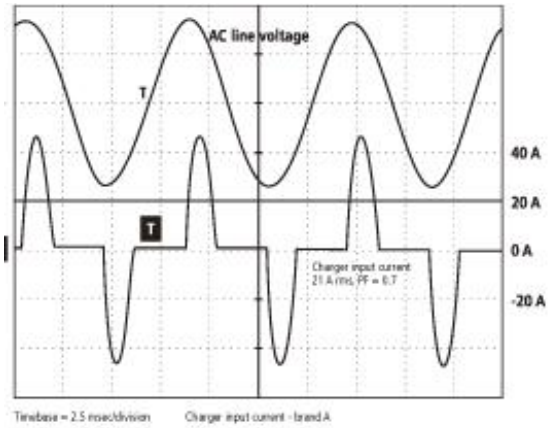

Figure 1: Quasi-square wave inverter-charger – current draw in charger mode
Source: The PROsine technology Advantage – Statpower (Xantrex) Whitepaper

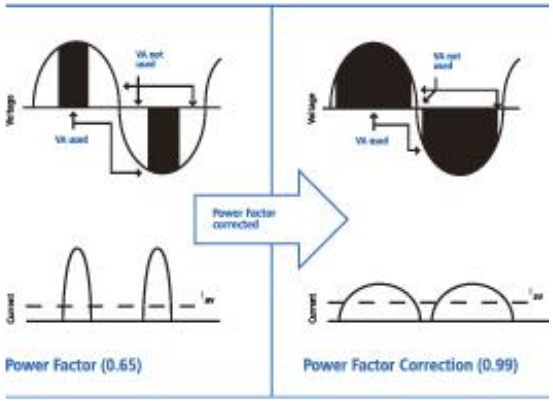

Figure 2: Power Factor: The ratio of true power to apparent power
Source: Pioneer Magnetics®

TRIDENT
ARGER

Features – Active PFC design available

Benefit of PFC version

- The charger is one of the largest AC load on a boat or RV. A significant befit of PFC version is less power is consumed by charger and meantime leave more for other appliance reducing the risk of main switch to be tripped in case of limited shore power available.

- Another benefit of PFC version is dramatically deduction of electrical noise, which minimize the chance of interfere with operation of TV, radio and satellite receiver.

TRIDENT
SMART BATTERY CHARGER

News – Powerful Remote controller is coming

Powerful remote controller for Trident is available from Sep.,2008 with following feature :

- Big and clear LCD screen
- All parameter of charger is visible and settable through remote controller
- Battery condition is visible
- Output power can be limited to avoid main switch to be tripped in case of small shore power available only

TRIDENT
SMART BATTERY CHARGER

Available models

- **12V12A-2 w & w/o PFC**
- **12V 25A-3 w & w/o PFC**
- **12V40A-3 w & w/o PFC**

- **24V20A-3 w/o PFC**
- **24V12A-3 w/o PFC**

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Complied standard

- EMC : EN55014-1,
- EN55014-2,
- EN61000-3-2 (only for PFC models)
- EN61000-3-3 (only for PFC models)

- LVD : EN60335-1,
- EN60335-2,
- EN50366

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SMART BATTERY CHARGER

Accessories

Trident smart battery offering a sensor as standard accessory, of which you can put it one your main battery. Through this sensor, we could achieve two functions:

- Temperature compensation : a temperature will be sensed and recorded prior to charging and a compensation charging voltage will be automatically calculated.

- Working as battery over temperature protection, smart charger will keep sensing battery temperature at periodic basis. In case of over temp happened, the charger will stop charging for safety.

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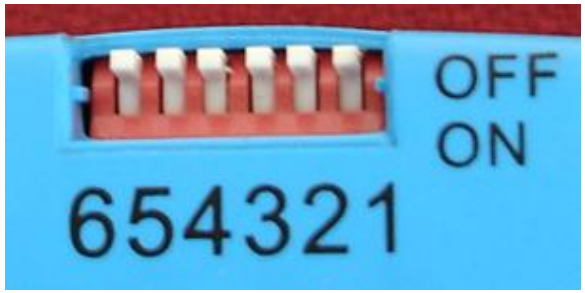
Features – Setting



	Function	OFF	ON
Switch 1	charger or DC power supply	battery charger	power supply
Switch 2	no use at present		
Switch 3	equalization program	not active	active
Switch 4	battery type		
Switch 5			
Switch 6			

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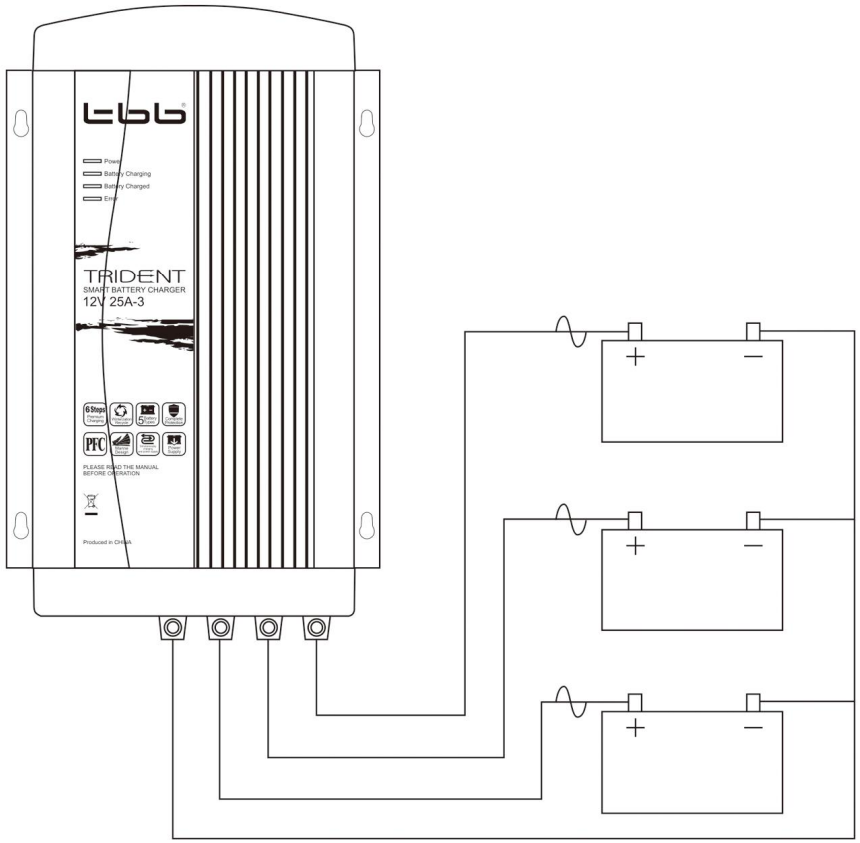
- **Through combination of switch 3, 4 and 5, you can choose to charge Flooded, Freedom (maintenance free), GEL or AGM battery**

Installation remark



TRIDENT

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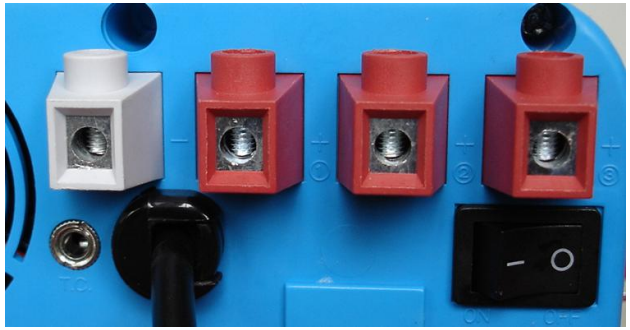
Installation remark



- **Recommended DC cable :**

Recommendation is up to 3 meters length. In case of longer, thicker cable is necessary.

Model	output	recommended cable
BP1212-2	12A	4mm2
BP1225-3	25A	8mm2 - 10mm2
BP1240-3	40A	13mm2 - 16mm2

- **T-sensor :** choose one battery to connect, normally power supply battery. In case of battery in different ambient, choose one with highest ambient temperature to connect with

- DC Fuse size was on manual

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Installation remark

- Installation position, can be installed in any position, preferable vertically.
- Environment, dry, well ventilated area, as close as possible to the batteries.
- This is done by natural convection or forced air cooling with fan.
- Be sure the airflow is not obstructed.
- No water and dust can enter the cabinet.
- Be aware of some noise from the fan, do not mount underneath a bed.
- Can be mounted in the engine room. If temperature is high the charger will automatically reduce output current and will protect itself for high temperature

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How to choose the battery charger size

- The starter battery is generally not included when calculations are made on battery charger capacity. The starter battery is only used for starting the engine and we can therefore assume it is only partially discharged. Whatever, while vessel is moving, the starter battery is recharged by the alternator. Only long time not in use in harbour, a proper floating charging is needed.

- As a rule of thumb we maintain that a charger capacity of 25% of the battery capacity is sufficient to charge the battery quickly and safely. Sometimes, you can use a charger up to 33%. Please refer to battery manufacturerôs recommendation.

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SMART BATTERY CHARGER

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THANK YOU