



## Instruction Manual

### Hybrid – BOOST Charge Controller with Bluetooth connection



WWW.  
[silentwindgenerator.com](http://silentwindgenerator.com)

Email: [info@silentwindgenerator.com](mailto:info@silentwindgenerator.com)

Phone: +351253572763

**Congratulations, you have bought a high-quality SILENTWIND hybrid charge controller HYBRID BOOST with Bluetooth connection**

Before first using this equipment please carefully read this manual.

**General information:**

The Silentwind charge controller HYBRID BOOST is a combined wind and solar charge controller with an inbuilt micro-controller. The HYBRID BOOST was especially developed for the Silentwind Generator and enables you to additionally install solar panels up to a wattage of 300 Watt peak or to a maximum current of 20A.

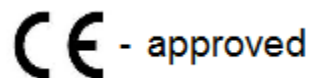
If you are using the 'Load' outputs, the charge controller can be configured to automatically switch off those outputs before the batteries are too deeply discharged, or turn on a light when it gets dark and turn off again when the sun rises.

Major operating parameters can be seen on an LCD on the front panel or all parameters can be seen on a tablet or smartphone over the Bluetooth connection. You can also set all operating parameters using the App provided for all Android and iOS devices.

The Silentwind Generator generates 3 phase AC voltage. In the charge controller AC is converted to a DC voltage. There are different models: 12 / 24 or 48 depending on the system voltage of the wind generator. All types of batteries (Gel, AGM, flooded and sealed lead acid and also lithium) can be charged.

The correct maximum charge voltage - depending on the type of battery - must be adjusted in the setup.

The charge-controller is



**Advice:**

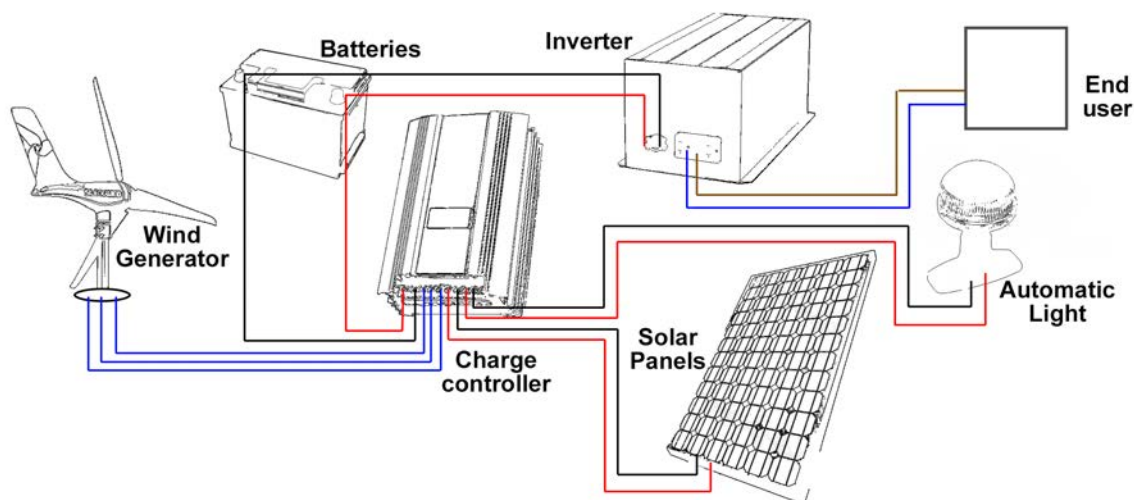
Please keep in mind that all lead acid batteries can emit hydrogen which is a dangerous explosive gas. If the place where you mount the charge controller is close to these batteries, ensure adequate ventilation. Gel or AGM batteries are normally maintenance free and should not emit gas if properly charged.

Always make sure the charge controller is mounted in a dry and as cool a place as possible.

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## 1. Wiring Diagram



## 2. Technical data

Hybrid-charge controller type	HYBRID BOOST
Battery system voltage (automatically detected)	12 / 24 / 48 Volt
Maximum power input from the wind generator	600 W
Maximum current input from the wind generator	40A / 30A / 15A
Maximum power input from solar panels	300W
Maximum current input from solar panels	20A / 10A / 5A
Maximum open circuit voltage input of the solar panel	50V DC
Maximum charging current to batteries	60 A
Maximum switch off current at LOAD output (Load)	2 x 10 A
Voltage adjustable for the battery types	flooded, sealed, gel or AGM
Dimensions (L x W x H) in mm	220 x 150 x 82
Weight	2,80 kg
Suitable for	flooded, sealed, gel or AGM
Warranty	24 months
<b>Features</b>	
Cable connection	screw terminals
Integrated electronic brake	charge limitation, storm brake
Integrated manual brake switch	service
LCD of all relevant working data	W, A, V/Ah, kWh, Ah
External stop switch	Plug connector

### 3. Components of the charge controller

#### 3.1 Bottom panel

On the bottom of the charge controller there are screw terminals to connect the battery, the wind generator, the solar panels and DC outputs. The connections for the remote brake are also below.

**Bottom panel:**



### 3.2 LCD

On the front of the charge controller there is an LCD that shows you all operating data during the working process.



### 4. Mounting the charge controller

The charge controller generates heat and should be mounted with the panel upright (if you can read the front panel text horizontally then this is correct). The side panels and back panel are a heat sink to dissipate heat, which is why the orientation is important.

The charge controller is mounted to the wall using four screws.

## 5. Cable size selection

As you can see from the wiring diagram in paragraph 1 a 3-pole cable with suitable cross section must be wired from the Silentwind Generator to the charge controller. The charge power gets from the charge controller to the batteries through two wires whereas on the AC input is three wires. Therefore the cross section of the two wires on the DC output should be greater; we recommend a minimum cross section of 10mm<sup>2</sup>.

See below table to find the correct cable cross section:

### System voltage 12 Volt

Distance from wind generator to the charge controller in m	0 - 9	10 – 19	20 – 29	30 – 44	45 – 69	70 – 110
Cable cross section mm <sup>2</sup>	6	10	16	25	35	50
AWG	10	8	6	4	2	1
Distance from the charge contr. to the battery in m	0 - 9	10 – 19	20 – 29	30 – 44	45 – 69	70 – 110
Cable cross section mm <sup>2</sup>	16	25	35	---	---	---
AWG	6	4	2	---	---	---

### System voltage 24 Volt

Distance from wind generator to the charge controller in m	0 - 9	10 – 19	20 – 29	30 – 44	45 – 69	70 – 110
Cable cross section mm <sup>2</sup>	2.5	4	6	10	16	25
AWG	14	12	10	8	6	4
Distance from the charge contr. to the battery in m	0 - 9	10 – 19	20 – 29	30 – 44	45 – 69	70 – 110
Cable cross section mm <sup>2</sup>	16	25	35	---	---	---
AWG	6	4	2	---	---	---

## 6. Installation and connection of the charge controller:

The charge controller should be mounted close to the battery in a ventilated and cool location, which enables you to read the information shown on the LCD and to operate the manual brake switch easily. There is a remote brake switch which can be used if the charge controller is not easily accessible.

### Safety advice:

Especially acid batteries can emit gas when charging. Therefore the charge controller must not be installed close to those batteries. In case of high concentration of dangerous gas there is a risk of explosion. Please note the safety regulations and advice of the battery manufacturer.

If the acid batteries are equipped with ventilation pipes to the exterior or if the storage room of the batteries is otherwise ventilated, the charge controller can be installed close to the batteries.

**Please find a sketch of the wiring diagram in the paragraph 1 of this manual.**

**Make sure that you fix the wires properly to prevent them from getting loose due to vibrations. Use correct size ferrules on all stranded wire into the charge controller. Fix the screws sufficiently to ensure electric contact.**

Crimp each wire from the wind generator with a suitable sized ferrule and then screw those into the terminals of the charge controller. The use of crimp ferrules is highly recommended on stranded wire as this makes better contact with the screw terminals of the charge controller.

**It is critical that you connect the charge controller to the battery using the correct polarity before connecting the wind generator.**

Please connect a suitable fuse (70 Amp. or more) close to the battery in the positive wire. This is to protect your boat from damage if there a fault develops in the charge controller and power is flowing back from the batteries to the charge controller.

**Please take note:**

After you have connected the battery you can connect the Silentwind generator, the solar panels and, if required, connections to the load outputs with maximum 10A. On the 3-phase output wires of the Silentwind you do not need to pay attention to polarity.

**Attention:** *Confusing the Positive and Negative connections will destroy your charge controller. In that case warranty is voided.*

If there is sufficient wind speed when connecting the Silentwind Generator, this will immediately generate electric power at the end of the 3 AC wires without being connected to the charge controller. Therefore we recommend blocking the Silentwind Generator blades with a rope before connecting the wires to the charger. The 3 AC output wires must be connected to the 3 screw terminals on the bottom the charge regulator. (See paragraph 3.1).

In case you want to connect additional solar power (max. 300W) to the charge controller, this should be done by using the PV screw terminals.

Please make always sure that you connect the solar panels with the correct polarity. You can find the connection diagram in paragraph 8.



## 7. External Stop Switch

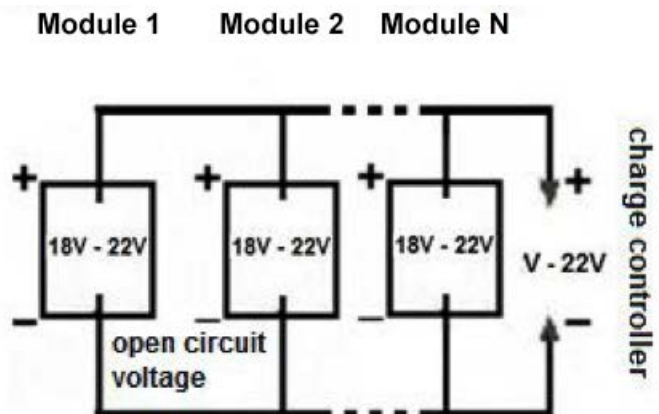
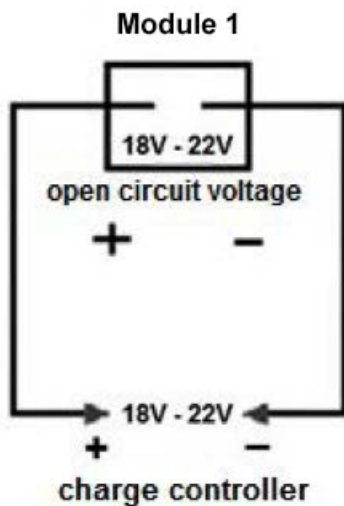
You can connect an external stop switch to the charge controller (see picture on page 5). You can choose the type of stop switch suitable to your instrument panel.

## 8. Connecting solar panels

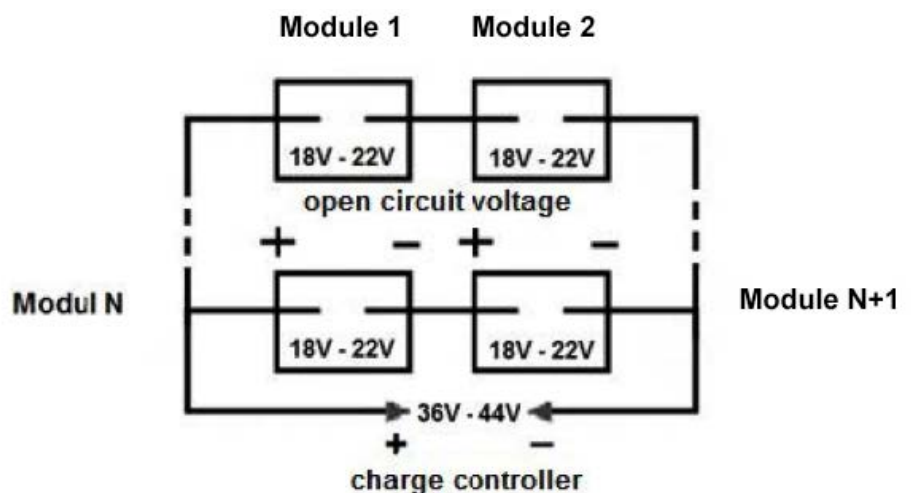
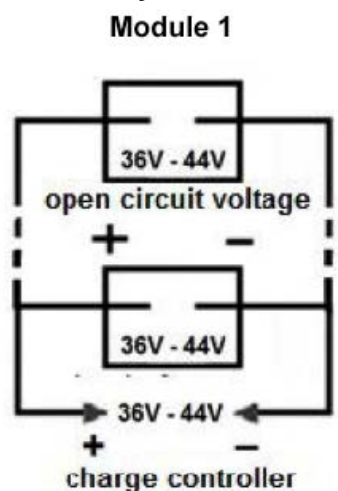
The charge controller Hybrid BOOST is a hybrid controller both for wind and solar energy. Solar panels with a max power of 300 Wp ( 20 A for 12V / 10 A for 24V and 5 A for 48V) can be connected, See technical details page 4.

Connect the solar panels according to the following sketch.

### 12 volt system:



### 24 volt system:



## 9. Programming the charge controller

Before using the charge controller it must be adjusted to the type of battery (flooded, gel, AGM) you want to use, the Storm brake and the absorption modus according to your system.

A special feature of this charge controller is that you can very easily programme everything through your Smartphone or Tablet. Download the App for your operating system (Android or iOS) from our website (Android) or on the Apple App Store (iOS). When the batteries are fully charged (they reach the 'Over voltage' set for the type of battery using the App) the charge controller will switch off the Silentwind generator. The maximum charging current for your battery type can also be adjusted. You programme the maximum charging current using the 'Brake Current' in the App.

We also recommend making use of the other additional adjustments according to your individual requirements, like the switch on and switch off voltage for the load settings and light function.

If batteries are fully charged (reach 'Over voltage') or maximum charging current is reached, the Silentwind Generator will stop for approx. 5 minutes.

The brake mode of the charge controller generates heat inside the charge controller which are carefully monitored by the micro controller. Therefore the break time of the Silentwind Generator will be increased in high wind speeds until the internal temperature is reduced by dissipation.

For this reason the charge controller should be installed on a place as cool as possible. Never install the controller at direct solar radiation or sunlight.

This means that the Silentwind Generator can also be operated with a large battery bank. If a larger battery bank is discharged, a higher charge current will flow in high wind speeds. As you can set the maximum charge current you can prevent overheating of the charge controller. As described in 'Brake Current' configuration you can reduce the maximum charge current according to the requirements.

### **Advice:**

*If the capacity of the batteries is less than 150 Ah, or old batteries have lost their original capacity, the point of maximum Voltage can be reached very fast although the battery is not fully charged yet. In this case it can be useful to connect an electric consumer to the Load output, as this will reduce the voltage and thus prevent that the break mode is activated too early.*

## 10. Programming instruction

### 10.1 APP Download

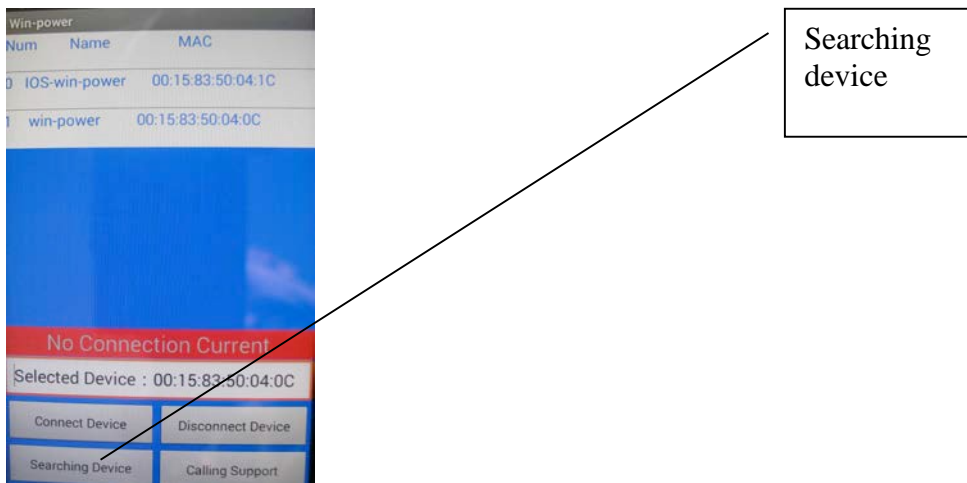
For Android devices please go to our website under following link: <http://www.silentwindgenerator.com/en/downloads> and download the APP Win-Power directly to your Smartphone or Tablet.

For iOS devices, please go to the Apple App Store and search for Win-Power. Download the App directly to your iPhone or iPad.

### 10.2 Settings

Open the App on your device. You will be requested to enable the Bluetooth.

Go to 'Searching Device'



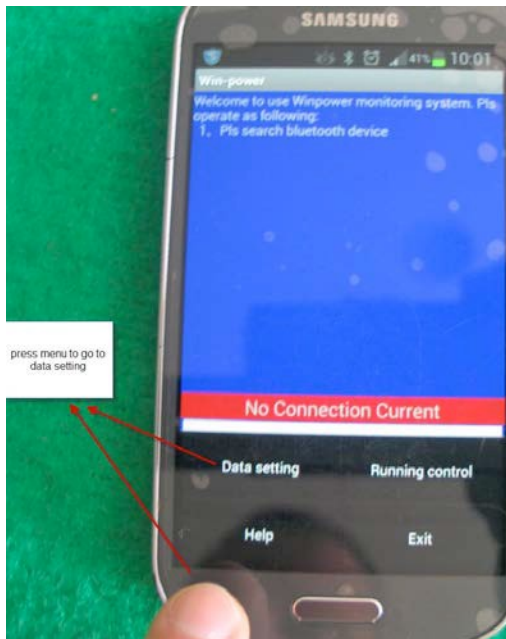
Check all Bluetooth devices and choose the one for your system. For Android choose 'win-power'. For iOS choose 'iOS win-power'.

Go to 'Connect Device'

The password for the connection is '1234'.

### 9.2.1 Setting parameters

Go to menu key on your device and then 'Data Setting'



### 9.2.2 Charging - Absorption mode



In the setup field '**Unload Volts**' shown above you can set the voltage for the absorption mode of your batteries by clicking on the field and change the value. Usually this stage is to slowly keep charging the batteries until the maximum charge voltage is reached. The value depends on the system voltage (12/24/48V). The approximate values are 5% less than the maximum charge voltage. For instance for a charge end voltage of 14.4V (12V system) the value should be 13.4V

### 9.2.2 Brake adjustment



You can set the maximum current when you want to stop the Silentwind Generator. This prevents overheating, especially with big battery banks and high loading currents. This function can also be used to reduce the RPM of the Silentwind Generator.

You can calculate the maximum charge current value as follows: The maximum power of the Silentwind Generator (400 Watts for the 12V wind generator) divided by the maximum cut-off voltage e.g. 14.4 Volt at a AGM battery. The maximum possible charge current in this example is therefore  $400VA / 14.4V = 27.7Amp$ .

### 9.2.3 Boost function



With this parameter you can set the Boost to achieve an earlier start of charging in to the batteries. The recommended values are:

- 12V – 2.0 V
- 24V – 4.0 V
- 48V – 8.0 V

### 9.2.4 Charge cut-off voltage



In the display mode shown above '**Overvoltage**' you can set the maximum charge voltage for your battery type. Please note the instructions of the manufacturer of the batteries. The maximum possible voltage is dependent on the system voltage (12/24/48V) and the type of battery (Acid, Gel, AGM or Lithium). For instance 12V-AGM battery: approximately 14.4V.

### 9.2.5 Save settings



Click on 'Save Data' to save the settings.

**Safety advice:**

*Please **never** disconnect the battery wires while the Silentwind Generator is charging. This will immediately destroy the charge controller. If you want to measure the charging current flowing, an amp meter must be installed in the positive battery wire. Ensure the correct polarity for the amp meter. However, the actual charging current flowing can be seen on the LCD on the front panel.*

## 11. Troubleshooting

### The blades of your Silentwind Generator are turning too slowly

- The manual stop switch of the charge controller is in 'BRAKE' position.
- Connecting the wind generator wires possibly caused a short circuit between the wires.
- The wind speed is too low.
- The fuse connected to the battery is gone.
- Your Silentwind Generator or the charge regulator has an internal problem. Please contact your dealer.

In order to find the problem you have to check the installation from wind generator through to battery.

- Disconnect the three wires wind generator from the charge controller. If the Silentwind Generator now does start the failure is between charge controller and the battery. BE CAREFUL not to touch the end of the cables because of the electric power that occurs at these ends.
- If the Silentwind Generator continues to turn slowly, the problem is between charge controller and Silentwind Generator. Check there are no shorts between the wires connecting the wind generator and the charge controller.
- Ensure the recommended cross section of the wire as well as the recommended minimum capacity of the battery that you want to charge.

### If the Silentwind Generator generates too little power

- The wind speed is too low, see the performance diagrams shown in the manual of the Silentwind. *The wind speed measured on top of the mast is usually higher than at the position of the wind generator!*
- Turbulences by obstacles in the wind direction or the location is unsuitable, mast too short.
- The wire cross section is correct for the length of the wires installed. (see page 3).
- The battery capacity is below 100Ah so that the maximum possible voltage is reached too quickly.
- The battery is too old and has lost capacity so that the maximum power voltage is reached too quickly.

***Enjoy collecting regenerative power. You contribute protecting the environment and saving your money !***



Rulis Eléctrica, Lda.  
Loteamento Industrial de Linhares, Lote 19  
PT-4805-486 Santo Estevão de Briteiros / Guimarães  
Portugal  
VAT/Contribuinte / EORI-N. PT 502 995 530  
Tel. 00351-253-572763  
Fax 00351-253-572764  
Tm/Handy 00351 96 790 79 33  
e-mail: [info@silentwindgenerator.com](mailto:info@silentwindgenerator.com)  
site: [www.silentwindgenerator.com](http://www.silentwindgenerator.com)