SWI-TEC

ALWAYS A GOOD IDEA

User Manual

Hydro & Solar Hybrid Charge Controller

Please read this manual very carefully. Failures may result in serious injury and permanent damage to the hybrid charge controller and attached Hydro Charger.

Important:
Never use the hybrid charge controller without a good connection to the batteries. It can destroy your controller!!

Contents:

A: Safety

This manual must be fully read and understood before installation.

If you feel you do not have the necessary ability to connect this device contact your distributor.

Failure to connect the hybrid charge controller as indicated in Part C of this manual could result in the destruction of both the hybrid charge controller and the hydro-charger.

Hydro generators must be connected to a load at all times. The hybrid charge controller is designed to fully protect the attached hydro charger.

Other important matters:

- Do not allow the unit to be exposed to moisture, rain or other liquids
- Protect the unit from direct sun and excess heat
- Ensure the unit is protected from unauthorised access including children
- Ensure all components are rated at the same voltage i.e. If you have generators rated at 12V, the solar panel and batteries should also be rated at 12V. The same applies for 24V systems.
- Ensure that the total Watts of all units connected do not exceed the TOTAL input for the SWI-TEC charge controller. The ideal mix being 600 watt for generators and 400 watt for solar panels.
- Ensure all connections are firmly tightened
- Select suitable wire sizes for the currents being generated

If you would like to connect the HydroCharger with Lithium batteries, you should obtain the autorisation of the battery manufacturer. In any case you have to connect a relay between the Hydro Charger and the controller , which is controlled through the electronic management of the Lithium battery. In case of problems with the Lithium batteries, we don t accept any form of warranty!

B: Features

The hybrid charge controller is a smart controller.

The integrated micro computer monitors all the necessary inputs and outputs to ensure precise control.

Key features:

- LCD display with input keys to allow user to alter values
- The unit will store information such as
  - Total amps generated
  - Total Kw hours generated
  - Amps used by load
  - And many more
- Connection of solar and hydro charger
- Auto sensing of voltage of batteries connected
- Ensures the batteries are maintained in best possible condition by preventing overcharging and over discharging
- Automatic braking of the generators. When the current is bigger than max charge current, controller will reduce the charge current gradually until no charging and brake totally
- You can choose the brake alert from 0-100 (preset is 10)
- Two manual switches black for brake, red for free-wheel
- A "Load" output where external devices can be switched on and off at user determined voltages
- The "load" output is also current limited to protect the connected device
- Night lamp control. After dusk load output will activate automatically, with full day light it will automatically stop.
- An alarm buzzer with red LED light on a 4m cable will advice you when voltage is high enough and the batteries are fully charged, that means the brake already started to reduce the rpms of the generators, in case of the hydro charger you should manually switch to the free-wheel operation and we recommend to take off the water of the HC to reduce drag and wear.

C: Connection

IMPORTANT: Failure to connect the hybrid charge controller as indicated could result in the destruction of both the hybrid charge controller and the hydro generator and possible serious injury or death.

Refer to connection diagram on next pages.

Always have the 3 wires from the generator shorted together if not connected to the hybrid charge controller. These wires have no polarity.

Ensure correct polarity is observed at all times i.e. Positive (+) to positive and negative (-) to negative for ALL connections to batteries, solar panels and boat circuits. Failure to comply with this will void warranty.

Steps:

1.Charge Controller right side: „Battery“ connection

First connect the batteries direct and with a fuse, so that the charge controller can detect the voltage 12V or 24V, automatically

The distance between Hydro Charger and Charge Controller should be as short as possible.

A cable with the right dimension is necessary between Charge Controller and batteries in order to reduce cable losses. We recommend a minimum section of 10 mm2.

12Volt System

Distance from Controller to Batterie 10 - 18 m

Cable section 10 - 16 mm2

24Volt System

Distance from Controller to Batterie 10 - 18m

Cable section 4 - 6 mm2

2. Charge Controller right side: „Load“ connection

The connection load allows connection of additional users , for example water maker, etc. up to maximum of 15 Amp. These equipments only receive power when the batteries reach the previous set up of the maximum voltage (approx. 12,9V/25.8V), or fully charged.

The desired on and off voltage of load can be reached by separated set up(user on/ User off)

3. Charge Controller left side: „Generator“ connection

Connecting the Hydro Charger to the charge controller by generator „~“

The 3 cables from the Hydro Charger can be free connected because its alternative current, therefore no need to follow the colors.

4. Charge Controller left side: „Solar“ connection

Connection of + and - on the solar panel to the Charge Controller on Solar + and -, correct and firm.

Use of Solar Panels up to maximum 400 Watt only.

5. Charge Controller left side: „Brake“ switch

Warning: the black switch Brake must be always in off position!

It has to be used only in case the generator has to be stopped electrically for short time in water.

6. Charge Controller left side: „remote brake“ connection

This connection is for the in delivery included Buzzer, which activates by reaching of the pre set battery voltage.

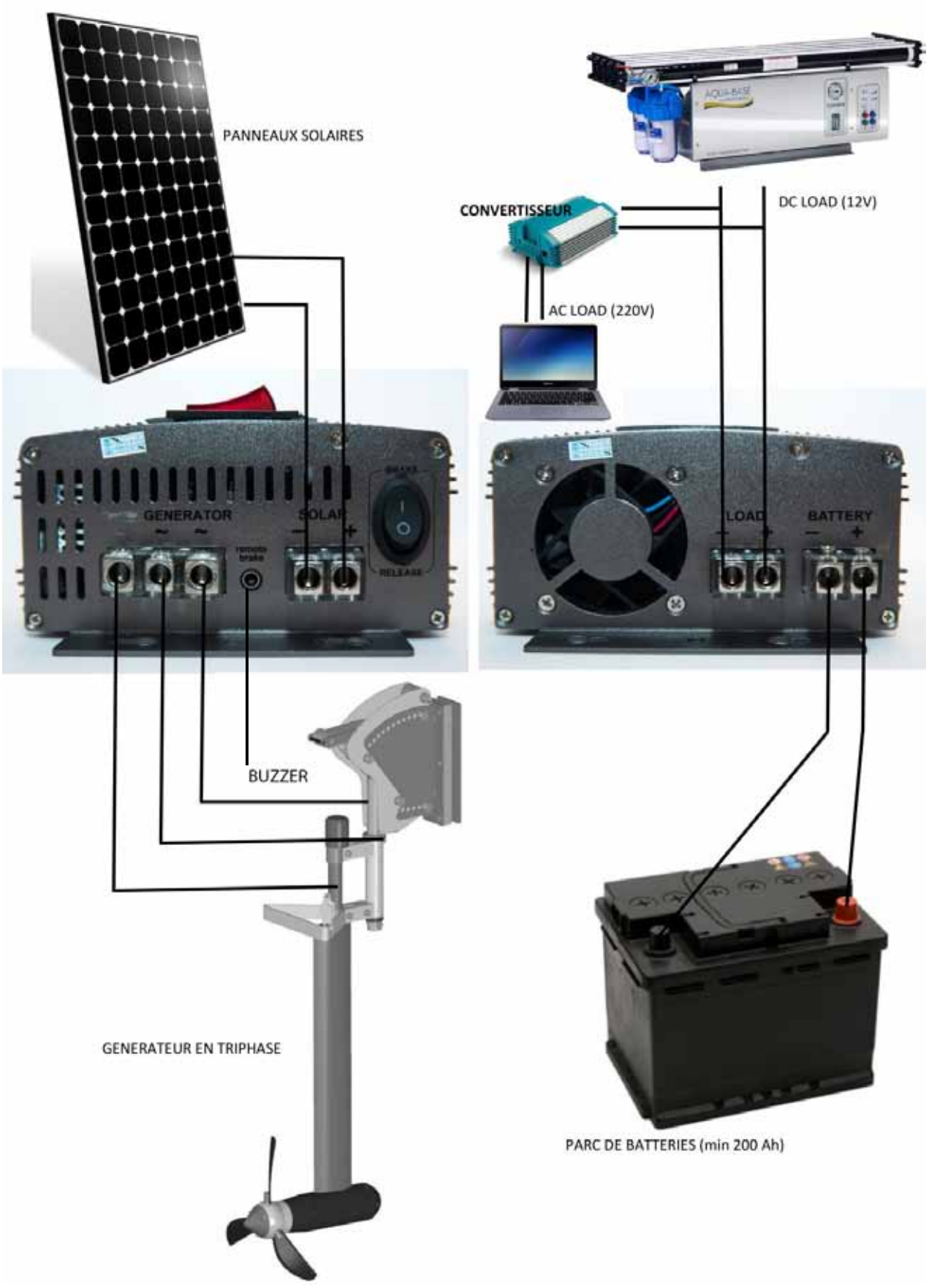
7. Control Charger front panel: „Freewheel“ red switch

This switch allows to run the generator on freewheel, this means the propeller turns free without generating any energy. It will be switch to on manually when the buzzer starts, indicating that the desired voltage has been reached. Now the propeller should turn free and the Hydro Charger can be taken out of water. If the buzzer is ignored, the brake starts automatically and stops the propeller. Now its strictly necessary to switch on freewheel or to take out of water the Hydro Charger. (if not following this step the Charge Controller will heat up unnecessary and could be damaged).

Recommendation: In case the generator has to be lifted down into the water during sailing and freewheel is „on“, its easier to pull the the HC to the working position using the lines.

Important: On some Charge Controller the switch connection is internally inverted,this means „free on“ and „free off“are inverted.

Connection diagram

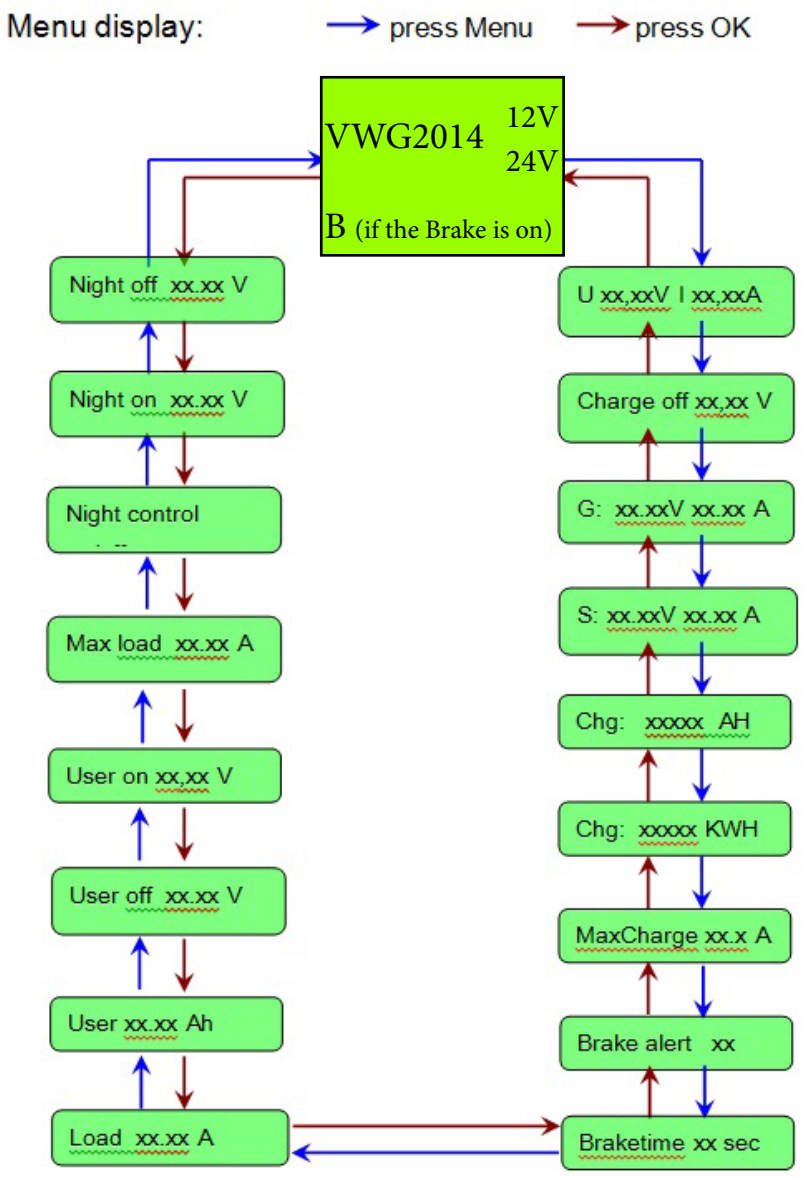


D: Menu System

Pressing „Menu“ or „OK“ you can go back- or forwards through the menu.

Pressing „Reset“ goes back to VWG2014

Pressing „menu“ 5 sec. goes back to factory setting



Screen description

VWG2014 12V B	12V battery voltage(B = brake switch on!)
VWG2014 24V B	24V battery voltage(B = brake switch on!)
U xx,xxV I x,xx A	V: battery voltage. A: current outlet from charge Controller to battery. Total Voltage and total current in Amp, all together Solar panels and generators.
Charge off xx,xx V	Charge off in V, (desired maximum voltage to stop generate energy , for example 14.4 V)
G x,xx A	Actual Generator voltage in V and generator current in Amp
S x,xx A	Actual solarpanel voltage in V and generator current in Amp
Ch g x,xxx Ah	Overall charge in Ah
Ch g x,xxx KWh	Overall charge performance in KWh
Max charge x,x A	Charge off current in A, 40 A from generator (adjustable +/-)
Brake alert x,x	Charge off, adjustable as per MPPT graphik 1-100 (+/-), recommended 5-10, according Battery status

„1“ means battery charge starts to float
„100“ means battery charge finished

Braketime xx sec	Braketime 0-60sec, adjustable (+/-) 30sec recomended

Load xx,xx A	Actual current flow to additional user(watermaker etc) in Amp
User xx,xx Ah	Provided current to additional user
User off xx,xx V	Voltage in V to stop current supply to additional user(+/-)(11.9V)
User on xx,xx V	Voltage in V to restart current supply to additional user(+/-) (12,6v)
Max load x,xx A	Max current for additional users (+/-) (15A)

These three display informations are valid only with connected solar panels

Night control on/off	Solarpaneltension switch on and off automatecly according to the desired voltage(without solar panel always off)
Night on x,xx V	Solarpanel: voltage to switch on user (+/-)
Night off x,xx V	Solarpanel: voltage to switch off user(+/-)

E: Battery and Menu configuration

The SWI-TEC hybrid charge controller is preconfigured with default settings in the user programmable locations.

	Default 12 volt battery	Default 24 volt battery
Charge off	14.4 volts (16V max)	28.8 volts (32 V max)
User off	10.5 volts	21 volts
User on	12.55 volts	25.10 volts
Brake time	6 mins	6 mins

The information below is provided as a guide only. The users should do their own research.

Wet Cell (flooded), **Gel Cell**, and **Absorbed Glass Mat (AGM)** are various versions of lead acid batteries.

If you would like to connect the HydroCharger with Lithium batteries, you should obtain the autorisation of the battery manufacturer. In any case you have to connect a relay between the Hydro Charger and the controller , which is controlled through the electronic management of the Lithium battery. In case of problems with the Lithium batteries, we don t accept any form of warranty!

Lead acid batteries should never be run flat. The maximum recommended discharge is 75% of the total. This means that the battery should have a minimum of 25% of charge remaining when it is put on charge.

The chart below indicates the amount of charge a battery has at the voltages shown.

Charge state	12 Volt battery	24 Volt battery
100% (full load)	12.65 V	25.30 V
75%	12.45 V	24.90 V
50%	12.24 V	24.48 V
25%	12.06 V	24.12 V
Discharged	11.9 V	23.8 V

If you want to get the maximum life from a battery be sure it is never discharged more than 75%! In fact slightly less is ideal.

Therefore for maximum battery life set „user off“ to 11.9V (23.8V) and „user on“ to 12.6V (25.2V)

F: Troubleshooting

Condition	Cause	Problem solution
No display	Battery discharged, not connected or faulty	Recharge battery, check connections or replace battery
No load output	Nightcontrol on and Solarpanel voltage is high than settled.	Set Nightcontrol on off or wait for the dusk
Generator not spinning	Brake switch is on	Turn off brake switch
Battery not charging	Battery too old	Replace battery
Generator not charging	Freewheel brake is on	Turn off freewheel brake to off

G: Specifications

Main parameters:

MODEL	VWG2014
Rated Power	1000W (Best ration: hydro/generator 600W, PV cells 400W)
Applicable batteries	12/24V, 100-300Ah
Night lamp control	On: 5.93/11.87V Off: 2.96/5.93V
Battery full charge cut	14.4V/28.8V (default, adjustable)max. 16V/32V
Battery low voltage disconnect load	10.5V/21V (default adjustable)
Battery low voltage reconnect load	12.55V/25.10V (default, adjustable)
Max charge current	40A/20A (default adjustable)
Max Load current	15A
Recovery time after the automatic braking	30 sec (default, adjustable)
Loss	≤40mA
Dimensions	278×133×75mm
Net Weight	1.7kg
Working environment	Environment temperature -10□～+50□, Relative humidity 0～90%

11. Warranty

SWI-TEC, Neveta Nautica S.L. guarantee, that this unit during 24 months, from the date of purchasing from SWI-TEC, has no material and production defects, which do not allow the perfect function of the HYDRO CHARGER. In case of defects during this period, immediate communication to SWI-TEC, Neveta Nautica S.L. is recommended.

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SWI-TEC will check the warranty claim and will repair the unit, depending of the damage, only parts or the whole HYDRO CHARGER. The place of guarantee is the production place in E-07680 Porto Cristo (Mallorca).

Assumption of guarantee is that the HYDRO CHARGER has suffered no unprofessional actions and the recommendations of the owner's manual are fully maintained during the use of the unit.

Damages through force majeure, as storms, as wars, etc. are not included in this warranty.

For all other cases the terms of business from SWI-TEC, Neveta Nautica S.L. are valid.

We wish you a lot of pleasure with the HYDRO CHARGER.

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