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VWG2014

Wind & Solar Hybrid Charge Controller

User Manual

Please read this manual very carefully. Failure to do so may result in serious injury and permanent damage to the hybrid charge controller and attached wind turbine. While every attempt has been made to ensure the information contained in this guide is accurate. we advise that we will not be liable for any omissions or inaccuracies.

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 wind turbine.

Wind turbines **must** be connected to a load at all times. The hybrid charge controller is designed to fully protect the attached turbine.

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 a turbine rated at 12 volts, the solar panel and battery should also be rated at 12 volts. The same applies for 24 volt systems.
- Ensure the total wattage of the unit is not exceeded ie for the VWG2014 the TOTAL input with the ideal mix being 500 watt turbine and 600 watt solar
- Ensure all connections are firmly tightened
- Select suitably wire sizes for the currents being generated

B: Features

The VWG2014 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 both solar and wind
- Auto sensing of voltage of batteries connected
- Ensures the battery is maintained in best possible condition by preventing overcharging and over discharging.
- Automatic braking of the turbine when battery fully charged and/or no load connected
- Automatic braking of the turbine when charge current is too high i.e. in very high winds
- Manual brake switch, also have remote brake interface.
- 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. when the Light dimmed load will automatically open, when the light is illuminated, the load will automatically close.

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 wind turbine and possible serious injury or death.

Refer to connection diagram on next page.

Do not erect or connect the turbine to the charge controller in windy conditions.

Always have the 3 wires from the turbine shorted together if not connected to the hybrid charge controller.

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

Steps:

1. **Always** connect the battery to the charge controller **first** as shown in the diagram on the next page.
2. Ensure brake switch is on.

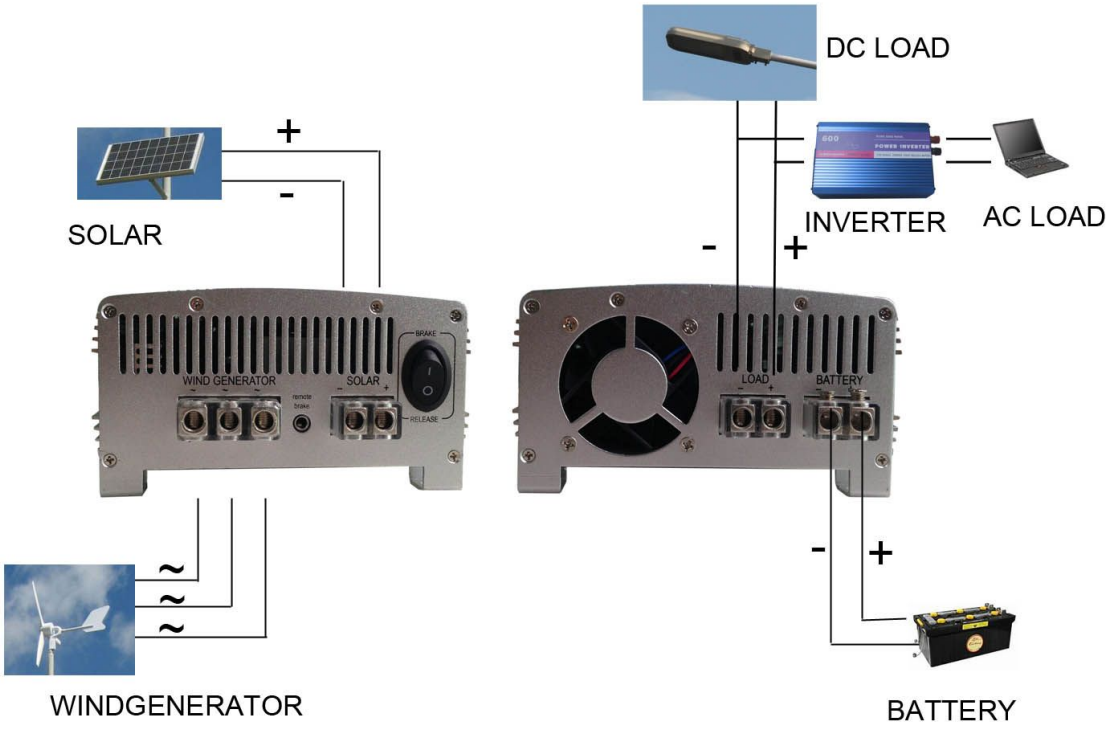
Do not proceed to the next step in windy conditions.

3. Remove one wire from the turbine leaving the other two shorted together and connect it to the hybrid charge controller as shown below
4. Remove the second wire and connect it to the hybrid charge controller. Note that at this point there is no load on the turbine until the second wire is connected to the hybrid charge controller so do this step as quickly as possible and NEVER do this in windy conditions.
5. Connect the third turbine wire.

The turbine is now protected.

6. Connect solar if have it as shown below.
7. Release brake switch and confirm turbine spins
8. Do not connect the load at this time until you have programmed the hybrid charge controller to values to suit the load

Connection diagram



The distance between wind turbine and the charge controller, charge controller and battery should be as short as possible.

Large sized cable is recommended between wind turbine and charge controller for the safety of the wind system. (Please refer to the following minimum wire size chart)

Large sized cable is recommended between charge controller and battery for reduce cable losses. We recommend a minimum cross section of 10mm^2.

12Vot system

Distance of wind turbine to controller (M)	10.6	10.7-17.6	17.7-28.2	28.3-44.1	44.2-68.1	68.1-110
Wire mm^2	10	16	25	35	50	65

24Vot system

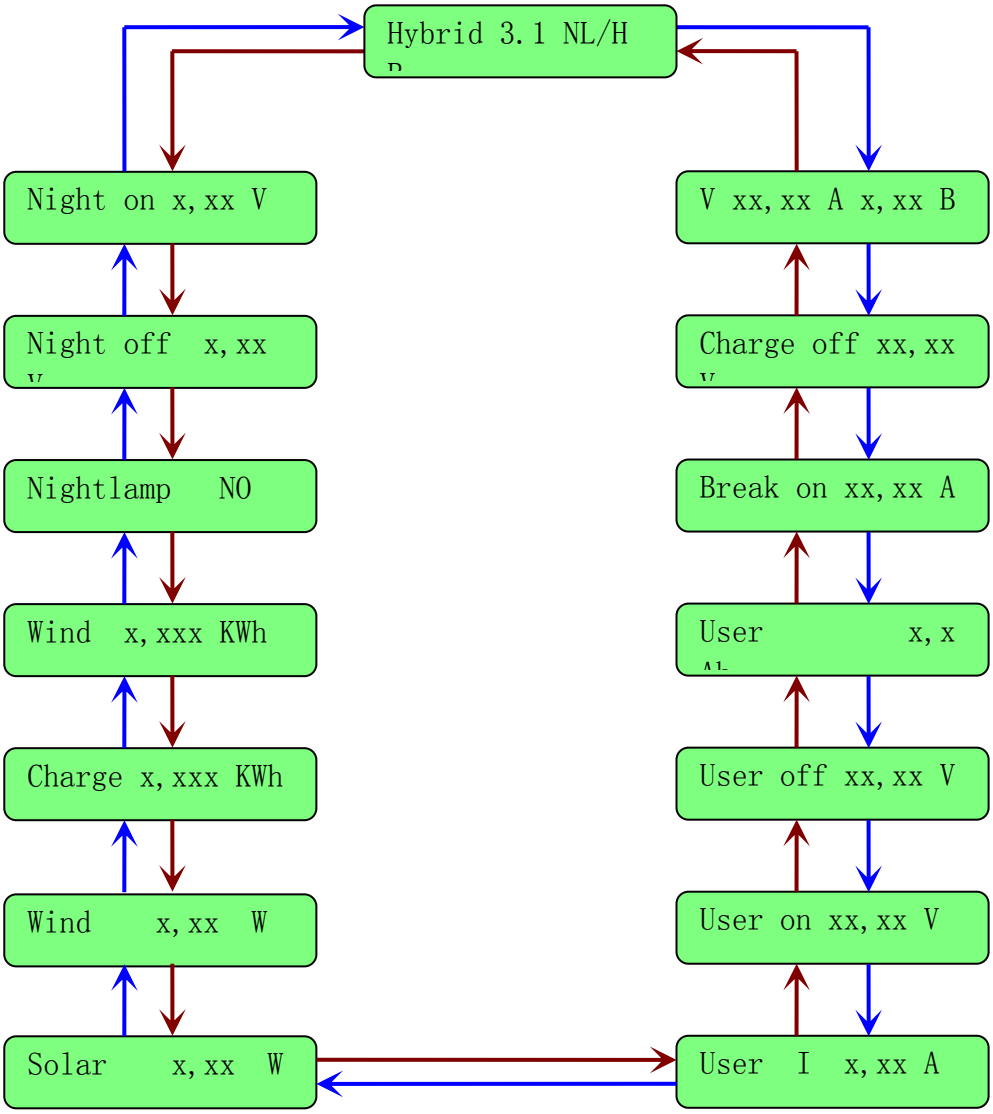
Distance of wind turbine to controller (M)	10.6	10.7-17.6	17.7-28.2	28.3-42.3	42.4-70.6	70.7-112.9
Wire mm^2	4	6	10	16	25	35

D: Menu system

Hybrid 3.1 NL/H

---- LCD display OK ---- press button

Menu display: press Menu press OK



■ **Boot screen**

Hybrid 3.1 NL B ： 12V battery mode

Hybrid 3.1 NH B ： 24V battery mode

■ **Examine battery voltage and charge current**

V xx,xx A x,xx B ： V: Battery voltage A: charge current B: Brake State

■ **Setup battery charge-off voltage**

Charge off xx,xx V

Set the battery charge off voltage. Press + or - to set the voltage value.

■ **Setup wind turbine brake current:**

Break on xx,xx A

Set wind turbine brake current. Press + or - to set the current.

■ **Examine discharge total AH**

User x,x Ah ： Display discharge. Unit: Ah.

■ **Setup load power off voltage**

User off xx,xx V

Setup load power off voltage. Unit: Voltage.

■ **Setup load boot-strap voltage**

User on xx,xx V

Setup load boot strap voltage. Unit: Voltage

■ **Examine discharge current**

User I x,xx A

Display discharge current.

■ **Examine PV instantaneous power**

Solar x,xx W

Display PV instantaneous power. Unit: Watts

■ **Examine wind generator instantaneous power**

Wind x,xx W

Display wind generator instantaneous power. Unit: Watts

■ **Examine total charged power**

Charge x,xxx KWh ： Charge （power generated，Unit: KWH）

■ **Examine total wind generator power generated**

Wind x,xxx KWh

Wind generator power generated. Unit: KWH

■ **Light control load on/off**

Nightlamp NO

Setup light control on / off. Press + set to YES, press - set to NO.

■ **Setup night lamp on PV voltage**

Night off x,xx V

Setup the PV voltage when load on. Unit: Voltage

- **Setup night lamp off PV voltage**

Night on x,xx V

Setup the PV voltage when load off. Unit: Voltage

E: Understanding batteries and suggested menu settings

The VWG2014 hybrid charge controller is preconfigured with default settings in the user programmable locations.

	Default 12 volt battery	Default 24 volt battery
Charge off	14.24 volts	28.49 volts
User off	11.27 volts	22.55 volts
User on	12.55 volts	25.10 volts
Brake current	20.56 amp	10.24 amp
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.

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% (fully charged)	12.65 volts	25.30 volts
75%	12.45 volts	24.90 volts
50%	12.24 volts	24.48 volts
25%	12.06 volts	24.12 volts
Discharged	11.9 volts	23.8 volts

If you wish to get the maximum life from a battery it is best to ensure it is not discharged more than 75% at any time. In fact slightly less is ideal.

Therefore for maximum battery life set User off to 12.46V (24.92V) and User on to 12.65V (25.30V)

If you use very little load and the turbine is constantly braking due to a fully charged battery condition reducing the Charge off voltage to 13.5V (27V) will also prevent constant overcharge conditions.

F: Troubleshooting

Condition	Cause	Fix
No display	Battery discharged, not connected or faulty	Recharge battery, check connections or replace battery
No load output	Nightlamp is “YES” and PV voltage is high than setting.	Set Nightlamp “NO”. or wait the light dimmed.
Turbine not spinning	Brake switch is on	Turn off brake switch
Battery not charging	Battery too old	Replace battery

G: Specifications

Main parameters:

MODEL	**VWG2014**
Rated Power	Wind turbine 1000W,PV cells 300W
Applicable batteries	12/24V
Night lamp control	On:5.93V/11.87V off:2.96V/5.93V
Battery full charge cut	14.4V/28.8V(default, adjustable)
Battery low voltage disconnect load	10.5V/21V（default，adjustable）
Battery low voltage reconnect voltage	12.55V/25.10V(default, adjustable)
Max Charge current	40A/20A（default, adjustable）
Load current	15A
Brake voltage	Based on the battery full charge voltage （adjustable）
Recovery time after the automatic braking	30s （default adjustable）
No load loss	≤40mA
Dimensions	278×133×75mm
Net Weight	1.7kg
Working environment	Environment temperature －10℃～+50℃， Relative humidity 0～90％