

# GudCraft WG400 Wind Turbine - Manual

## NOTICE

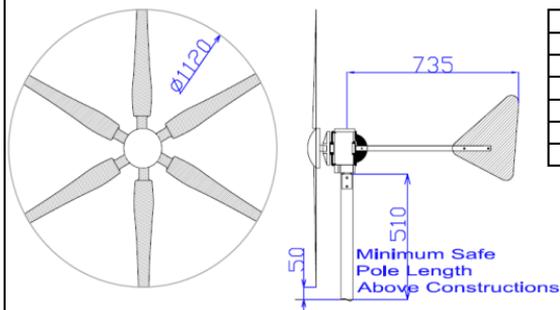
1. This information is believed to be reliable; however, We assumes no responsibility for inaccuracies or omissions. The user of this information and product assumes full responsibility and risk.
2. All specifications are subjected to change without notice.
3. Wind generators must be installed following the guidelines established by local regulations.

## IMPORTANT

We send a free controller in every package to our clients, this controller can only work with our wind turbine, it is just for convenience and not for sale. Please use the controller supplied for this wind turbine kit.

If you do not use the recommended controller, please make sure the electric brake is properly designed and included in your electric circuit to prevent unexpected body injuries, property damage or death.

This wind turbine has a brake function and manual stop function, which is achieved with controller supplied.



**Figure 1: Specification**

<b>Rotor Diameter</b>	<b>1.12M</b>
<b>Net Weight</b>	<b>7 Kg</b>
<b>Cut-in Wind Speed</b>	<b>2.1M/S</b>
<b>Rated Power</b>	<b>250W</b>
<b>Max Power</b>	<b>400W</b>
<b>Pole Dimensions</b>	<b>Inner Diameter 41mm</b>
<b>Package Weight</b>	<b>About 10Kg</b>



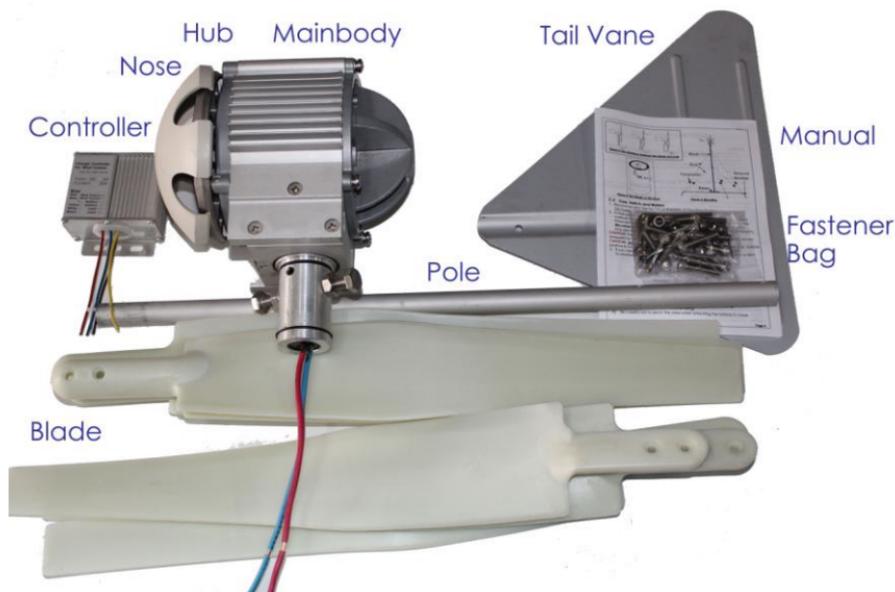
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## A. Package Contents

The wind turbine is shipped partially disassembled. Please compare with the parts shown in [Figure 1](#) to ensure that all necessary parts are included. Please refer to [Figure 1](#) for instruction.



### What do we have now:

1	Mainbody	1 pcs
2	Hub	1 pcs
3	Nose Cone	1 pcs
4	Blade	6 pcs
5	Pole for Tail	1 pcs
6	Tail Vane	1 pcs
7	Controller	1 pcs
8	Manual	1 pcs
9	Fastener & Tools	→

Fastener	Pcs	
M16 Nut	1	For Hub
$\Phi 6^*30$ Screw	14 + 1(spare)	For blades & tail
M6 Nut (Nyloc)	14 + 2(spare)	For blades & tail
Tools		
5mm Hex Key	1	

## B. SAFETY PRECAUTIONS (Important)

1. Safety must be the primary concern as you plan the location, installation and operation. Please be aware of electrical, mechanical and blade hazards.
2. DO NOT install the turbine where anyone could approach the blades.
3. Use common sense and be careful.
4. Select the correct wire size, and the correct fuse size.
5. When install, make sure the turbine is disconnected from the batteries.
6. Do not let the blade free until the turbine is mounted on the tower.
7. Never approach the turbine during operation.

## C. Prepare for installing

### C.1 The following general tools may be required when installing.

Screw driver  
Wrench or spanner  
Electric soldering iron  
Heat shrink or electrical tape  
Multi-meter

### C.2 Controller

We supply a free wind controller with the wind turbine. It is used to protect the batteries and the wind turbine. And also you can make your own hybrid system. A solar controller is needed when you install the solar panels. Go for the guide of the controller to see the details.

### C.3 Wire

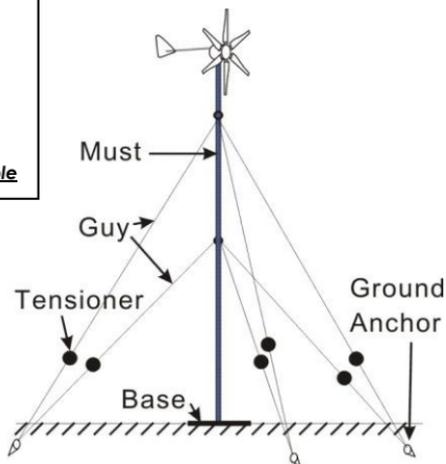
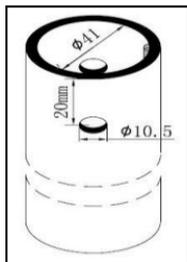
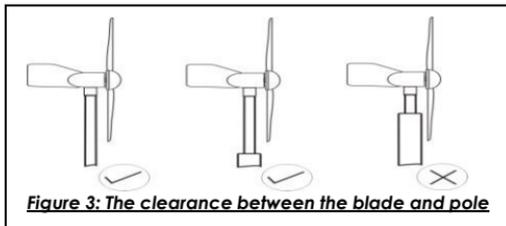
If the cross section area of the wires are NOT sufficient, the wires will be heated up and will create a fire hazard all along the wires. Please choose the right size of the wires.

#### Minimum Wire Size (X-Section Area):

Distance From Batteries to Turbine	0-9M	9-18M	18-27M	27-45M
Wire X-Section Area for 12V Wind Turbine	4mm <sup>2</sup> 12AWG	6mm <sup>2</sup> 10AWG	8 mm <sup>2</sup> 9AWG	10mm <sup>2</sup> 8AWG
Wire X-Section Area for 24V Wind Turbine	2.5mm <sup>2</sup> 14AWG	4mm <sup>2</sup> 12AWG	6mm <sup>2</sup> 10AWG	8mm <sup>2</sup> 8AWG

### C.4 Pole or Must

1. This wind turbine is designed to fit inside an aluminum or steel tube with a standard internal diameter of 41mm. Do not use plastic pipe. A inner diameter 41mm (1 5/8") iron pole is easy to get (water pipe or scaffold tube) . Usually it has a weld seam. The adapter of the wind turbine has a flat on one side to clear the seam.
2. A suitable mounting pole can be erected using a 6 meter galvanized tube. Supported by 3 or 4 guy lines.
3. Make sure a minimum 50 mm clearance must be given between the blade tips and any obstructions. Refer to [Figure 3](#).
4. Mark and centre-punch two positions diametrically opposite, at 90o to the pipe seam if necessary, 20mm from top of the tube (Refer to [Figure 4](#)).
5. Drill two holes, 10.5mm.



## C.5 Fuse, Switch and Meters

1. Recommended Size for Circuit Breakers or Slow-Blow Fuses:

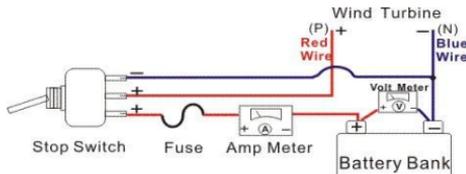
12V model: 25A DC    24V model: 15A DC

2. A stop switch is not necessary, but sometimes useful. It provides a convenient method for shutting down the turbine manually. A 20-amp single-pole double throw switch wired as shown in [Figure 6](#) is OK for our application. The switch **disconnects the battery** and then **shorts the turbine wires** causing the turbine to stop spinning (in high winds the blades will spin slowly).

**CAUTION:** The center post must be positive from the turbine. Outside posts can be swapped as either battery positive or battery/turbine negative.

**CAUTION: DO NOT** connect the turbine "backwards" to the battery (i.e. turbine positive to battery negative). This will damage the circuit inside the system.

3. If you need the Amp Meter (DC30A or 20A) and the Volt meter (DC30V or 50V) to monitor your system. Please see the [Figure 6](#).



## D. Installation

### D.1 Please follow these precautions during the installation:

- 1) THINK SAFETY! Have someone available to help when installing.
- 2) Disconnect batteries from turbine wiring.
- 3) Be careful not to pinch the wires when attaching the turbine to tower.

### D.2 Step-By-Step Instructions

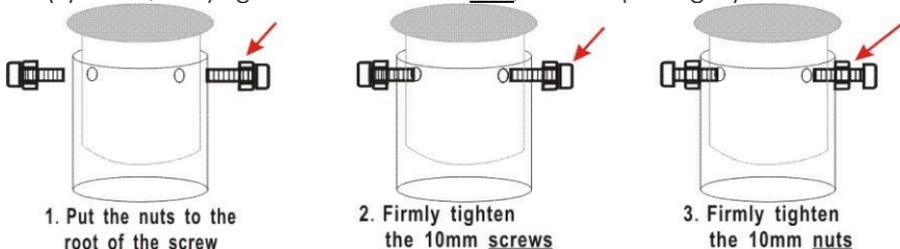
## Fix the wires and the yaw bearing

- 1) Run the 2 wires from the regulator (usually put the regulator near the battery), through the pole from the top of the tower. **NOT** to connect the wires to the battery until everything else has been completed.

Strip the insulation back from each side of wires. Mark both ends of the wires with tape to identify the polarity: **Red = Positive (+); Blue = Negative (-)**

**CAUTION:** If you are uncertain of the polarity of the wires, simply spin the rotor shaft and measure the voltage direction with a volt meter.

- 2) Connect the wires from the wind turbine to the wires running to the regulator. Insulate the connections using either heat shrink tubing or a quality electrical tape.
- 3) Once the wires are attached to the turbine, gently pull the wires down through the tower sliding the yaw shaft over the steel pipe. Slide the yaw shaft down over the end of the pole carefully, not to pinch the yaw wires. Leave enough slack in the wires so that if necessary, the turbine can be removed.
- 4) Once the yaw shaft is on the tower,
  - (A) First, firmly tighten the two 10mm **screws** with a wrench.
  - (B) Then, firmly tighten the two 10mm **nuts**, hold the pole tightly.



**Figure 7**

**CAUTION:** Make sure that your turbine is securely attached to the mounts. Remember that this attachment will have to hold in high winds.



**Figure 8.1: Fix the blade**



**Figure 8.2: Fix the Hub**



**Figure 8.3: Cotter Pin**



**Figure 8.4: Fix the Tail Pole**

## Fix the blades and the Hub (Figure 8.1 to 8.3)

- 5) Hold the shaft with a screw driver, turn the Hub anticlockwise, to remove the Hub from the shaft. (The Hub is fixed on the shaft when package.)

- 6) Fix the blades onto the Hub, **Securely tighten** all the screws and nuts.

**CAUTION:** Make sure the front face of the blade is toward the wind.

- 7) Put the M16 nut into the middle of the Hub, then put the Hub on the top of the rotor shaft. Hold on the rotor shaft with a screw driver as long as turn the Hub **clockwise**, assemble it onto the shaft.

- 8) Fix the cotter pin into the small hole on the top of the shaft.

9) Put the nose cone to the head of the shaft.

### Fix the tail

10) Fix the tail vane on the tail pole, securely tighten the screws and nuts ([Figure 8.4](#)).

11) Insert the end of the pole in to the hole of the rear cover, securely tighten the screws.

**CAUTION:** *The vane should be perpendicular to the ground.*

### Fix the controller < Please see the controller guide >

12) Run the wires from the turbine to the Controller. Attach positive (Red) wire to a fuse. Attach wires to the Controller.

**Red = Positive (+); Blue = Negative (-)**

13) Before attaching the wiring from regulator to the battery, make sure:

- All circuit breakers are in the off position
- The stop switch is in the "stop" or shorted position (if installed)

14) Attach wires to the battery.

15) Turn on the stop switch if you have installed one.

16) You have now completed the installation process.

## D.3 Operation

Check support structures, blades, and electrical systems.

1. Do not let the rotor blades come in contact with a solid object. Use common sense about safety when locating the turbine.
2. When performing periodic inspections, or at anytime when you must approach the path of the blades, disconnect the power leads from the battery and tie the wind turbine output leads together to **stop (slow down)** the blades from rotating. The turbine can also be shut down through the use of a stop switch. Please refer to [Figure 6](#) on how to install a stop switch in your system.
3. Please note that there is a short break-in period with new turbines. The bearings will require approximately 100 hours of operation in normal wind before they are running at peak efficiency.

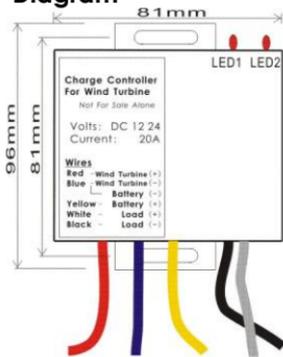
## D.4 Trouble shooting

1. An AMP meter is recommend to be connected in your system, verify the current being normal status when the blades turning.
2. If no output when wind is OK, first check if every connector is well connected.
3. Open-connect the controller, connect the wind turbine direct to the battery, see what you have in the amp meter.
4. If it is OK when get off the controller, unpack the controller and check the Fuse.
5. The wind turbine has a auto-protect device, it will shut down when over speed or the output voltage and current is higher, and will everything return.

# Guide of the Wind Controller

- This controller is designed for our Wind Turbine only. It can not work with other equipments.
- We support this controller free with our wind turbine. It also can lower the total cost of the renewable power system.
- Please use the corresponding voltage rating model for your system.
- Do not exceed the current rating (20A), if the load is large, please contact the load direct to the polar of the battery.
- For one wind turbine only, please follow the *Figure b*.  
In a wind and solar hybrid power system, please follow the *Figure c*. You can use a solar controller with this wind controller, connect the DC load to the solar controller.

## X.1 Diagram



### Wires

- |           |  |                  |  |
|-----------|--|------------------|--|
| 1. Red    |  | Wind Turbine (+) |  |
| 2. Blue   |  | Wind Turbine (-) |  |
|           |  | Battery (+)      |  |
| 3. Yellow |  | Battery (+)      |  |
| 4. White  |  | Load (+)         |  |
| 5. Black  |  | Load (-)         |  |

### LED1

Red 'ON' – when battery is well connected.

Red 'OFF' – when battery is not connected correctly.

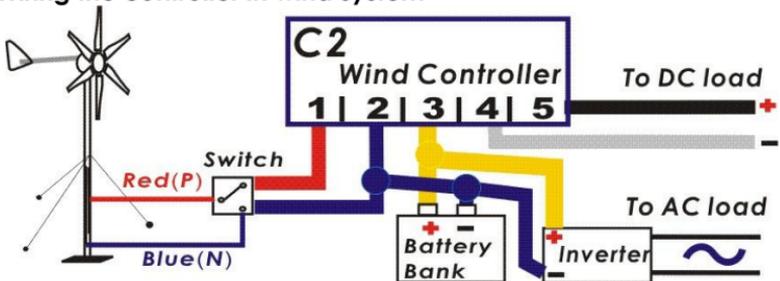
### LED2

Red 'ON' – when load can be supplied.

Red 'OFF' – when battery is over-discharged.

*Figure a. The diagram of the controller*

## X.2 Wiring the controller in wind system



*Figure b. Wiring the controller with a wind turbine*

1. The switch is optional.
2. First, please connect the battery (+) and (-) to the correct connectors. And the left led will light-on.

**Note:** Please connect the Wind Turbine(-) and the Battery(-) together to the blue wire of the controller.

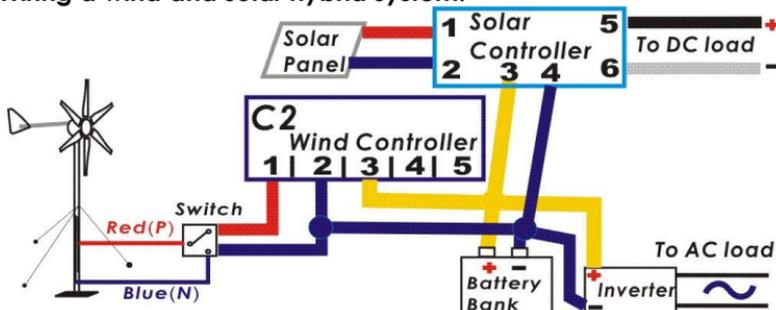
3. Second, please connect the wind turbine **red wire(+)** and **blue wire(-)** to the correct connectors.
4. Third, please connect the load (+) and (-) to the correct connectors.

**Note:** If it doesn't connect the load, please confirm the white wire and the black wire are isolated

5. Sometimes a inverter is needed to get proper AC power for your load.

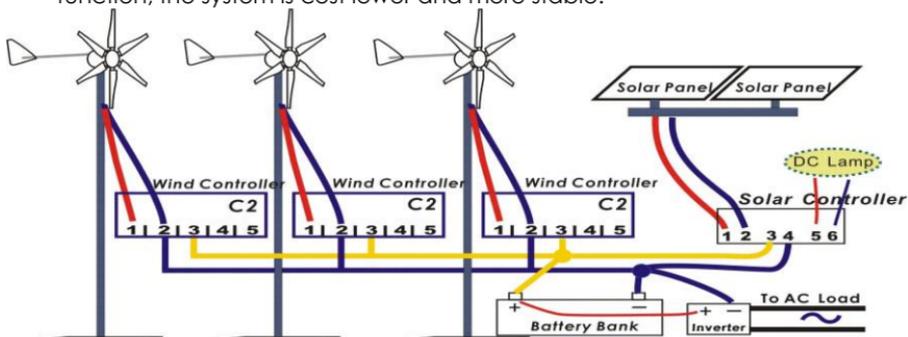
**Note:** If you have a inverter in the system, please connect it directly to the battery, most inverters has a low voltage inspection.

### X.3 Wiring a wind and solar hybrid system.



**Figure c. Wiring the controller with a wind turbine**

1. Follow the *Figure c* or *Figure d* when wiring the hybrid system.
2. The DC load can connect to the solar controller. In the hybrid street lamp system, choose a solar controller with lamp control function, the system is cost lower and more stable.



**Figure d: System Wiring**

### X.3 Specification of the Controller:

Voltage	12V or 24V
Max amp of Fuse	20A
Self-consumption	6 mA
Temperature	-40 to +60°C
Enclosure	IP65

	12V Type	24V Type
Battery Disconnect (Over-charged)	16.1V	32.2V
Battery Reconnect	14.7V	30.3V
Low V Disconnect (Over-Discharged)	11.0V	22.0V
Low voltage Reconnect	12.2V	24.0V

1. After over charged, the controller will resume working when the battery is back to 14.7V (or 30.3V for 24V battery).
2. After over discharged, the controller will resume working while the battery voltage is over 12.2V (24V for 24V battery).