

WindLab Junior

WL-J

Operating Instructions

This wind power generator is designed for children to learn the wind power technology. You may use the natural wind or a fan as the source of wind for doing experiment or drive electrical appliances. A **Light & Music Module** is included for your evaluation. It has 3 functions, namely **Music**, **Flash LED** and **Torch LED**. Connect the RED and BLACK wire of the module to the RED (+VE) and BLACK (GND) terminals respectively on the DC electrical output connector and observe the results.

The LED inside the main body lights up when the generator is generating electricity. Vane will automatically align the generator to the direction of the wind.

This generator operates in two modes, namely "Normal" and "Direct". There are 2 switches ("Normal / Direct" and "0 / 1") to control the output to the DC electrical output connector.

| Switch Function | | S2 | |
|--------------------|---|---|--|
| | | Normal | Direct |
| S1 | 0 | Generated Electrical Energy charges the Gold Capacitor; Gold Capacitor Output to Connector switched OFF | Generated Electrical Energy connected to the Output Connector directly; Generator is not connected to the Gold Capacitor |
| | 1 | Generated Electrical Energy charges the Gold Capacitor; Gold Capacitor Output to Connector switched ON | Electrical Energy does not charge the Gold Capacitor; Gold Capacitor Output to Connector switched ON |

"NORMAL" mode

In "Normal" mode, the generated electricity is to be stored in the Gold Capacitor. The "0 / 1" or "ON / OFF" switch switches the stored electricity to the output connector.

"Direct" mode

In "Direct" mode, the generated electricity is connected to the output connector directly when the "0 / 1" switch is slided to the "0" position. The output of the generator is ready for your evaluation of various parameters of the Wind Power Technology. These include the relation of wind speed to the rotation speed of the rotor; blades shape and size to the output electricity etc. You may also use it to drive your appliances directly or your external storage devices. If the "0 / 1" switch is slided to the "1" position, the output connector is connected to the Gold Capacitor. The stored energy can be used. However, the generated electrical energy will neither be stored nor sent to the output connector.

Blade and Vane

The WindLab Junior comes with a set of 3 blades and 1 vane. They are cut from flexible plastics (Poly-Propylene) sheets. The design concept is to let you design your own blades and vanes with easily available plastic or paper card sheets. Scissors and Punch are the standard stationery needed to work with your imagination to create your own blades and vanes. You can modify the number, size and shape of the blades to see what happens to the output of the DC electricity at the output connector. You may also modify the size, shape and color of the vanes to make fun with it.

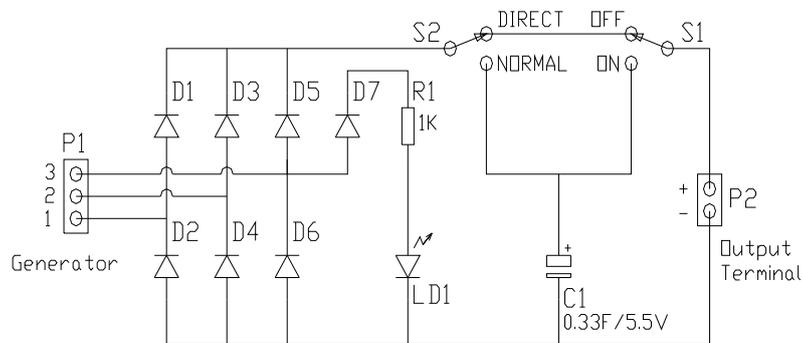
Features:

- Kit for hands-on experience
- Convert wind energy to DC electrical energy
- Rectified DC electrical output to Gold Capacitor for Storage
- Rectified DC Direct Output for evaluation on various parameters
- Visual indication when DC electrical energy is generated
- Vane will automatically align the generator to the direction of the wind
- The DC electricity can be used to drive your electrical appliances
- You can learn means to save the environment
- Fun to play with

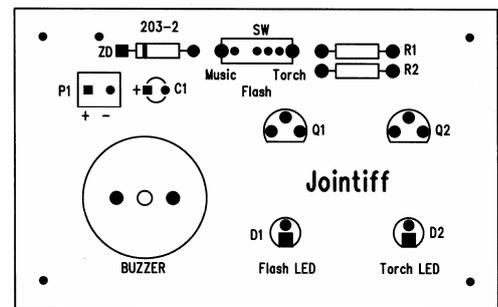
Specification:

| | |
|--|----------------------|
| Power Capacity (@ Rotor speed of 2000 rpm) | :- 1W |
| Direct Output Voltage (@ Rotor speed of 2000 rpm) | :- DC 10V |
| Direct Output Current (@ Rotor speed of 2000 rpm) | :- DC 100 mA |
| Direct Output Voltage (@ Rotor speed of 1000 rpm) | :- DC 5V |
| Direct Output Current (@ Rotor speed of 1000 rpm) | :- DC 50 mA |
| Maximum Output Voltage from Storage Capacitor | :- DC 6V |
| "Direct / Normal" switch to direct Turbine Output to Output Connector or Storage Capacitor | |
| "0 / 1" switch to select Output from Turbine Output or Storage Capacitor | |
| Charge-Up Time (Capacitance 0.33F, Wind Speed @ 5 mph) | :- 1 min. |
| Music Box can sound for | :- 30 min. |
| Or LED can light for | :- 5 min. |
| Start-Up (Rotor start to turn) Wind Speed | :- 3.5 mph (1.6 m/s) |
| Cut-In (Generator starts to generate electricity) Wind Speed | :- 5 mph (2.2 m/s) |

Schematic Diagram – WindLab Turbine



Light & Music Module



Assembly Instructions

Refer to the attached assembly drawing and the Part List reference numbers.

I. Main Body Assembly

Plug the connector of the generator (10) to the socket on the Printed Circuit Board Assembly (11).

Install the Generator (10), Printed Circuit Board Assembly (11) and the Vane (9) in the Main Body Housing (1 & 2).

Secure the assembly with screws (13) and nuts (16) as shown in the diagram. You may press the 3 nuts (16) to the Left Housing (1) first with the help of the long screw (14).

II. Blade Unit Assembly

Press 3 nuts (16) to the nut holders alternately on the back side of the Blade Base. The blades are not symmetrical. If the Blades are installed with the wrong side on top, the Blades will hit the Aluminium Post as the unit rotates. Note this carefully on the drawing for assembly. Install the Blades (8) alternately on the Blade Base (4) and put on the Blade Head (3). Install the 3 screws (14) through the holes on the Blade Head to the nuts (16) on the back side of the Blade Base. Make sure that the screws are aligned with the nuts when you secure the screws.

III. Blade Unit Installation

Plug the Blade Unit to the shaft on the Main Body Assembly. Make sure you press the Blade Unit all the way to the shaft. Check that the Blade Unit is securely clipped to the shaft of the turbine.

(You may also install the Blade Unit after you assemble the Post and Support Base Assembly.)

IV. Post and Support Base Assembly

Install the Aluminium Post (7) on the Support Base Assembly (5) with the Post Secure Pin (6)

Install the Body Assembly on the top of the Aluminium Post and secure it with the screw (15).

Your WindLab is now ready to work for you.

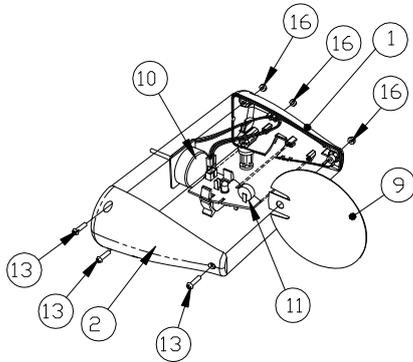
Warning

Keep your hands and your body away from the blades when it is rotating to avoid injury.

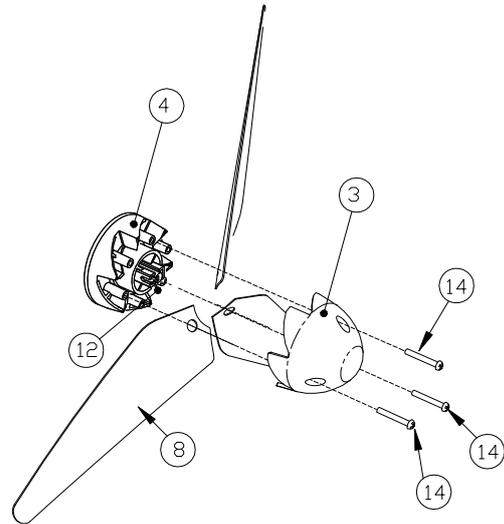
This product contains small parts. It is not suitable for children under 8 years old.

Assembly Drawing

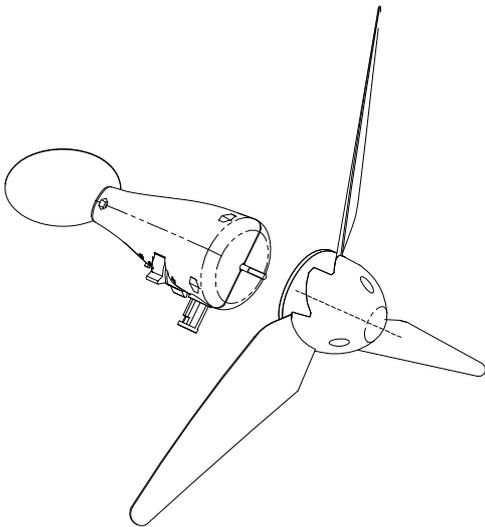
I. Main Body Assembly



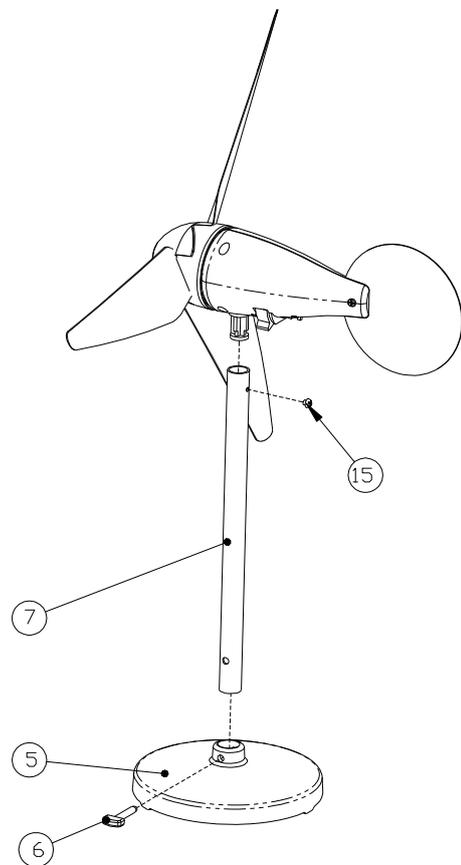
II. Blade Assembly



III. Blade Head Assembly



IV. Post and Support Base Assembly



Part List

1. Left Housing
2. Right Housing
3. Blade Head
4. Blade Base
5. Support Base Assembly
6. Post Secure Pin
7. Aluminium Tube
8. Polypropylene Blade
9. Polypropylene Vane
10. Generator
11. Printed Circuit Board Assembly
12. Spring Plate
13. Screw, M2.6 x 10 mm
14. Screw, M2.6 x 18 mm
15. Screw, M3 x 2 mm
16. Hex Nut, M2.6